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TRANSonic FAN/COMPRESSOR ROTOR DESIGN STUDY

Volume VI

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General Electric Company
Aircraft Engine Business Group
Advanced Technology Programs Dept.
Cincinnati, Ohio 45215

February 1982

Final Report for Period September 1980 - February 1982

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This technical report has been reviewed and is approved for publication.



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)	This report describes the aerodynamic design of a series of five transonic rotors all parametrically related to a baseline design documented in Technical Report AFAPL-TR-79-2078. Each of the five designs deviate from the base line, in so far as practical, by a variation of parameter only. The parametric variations are specified at the rotor tip. The original hub characteristics were preserved to the maximum extent practical. The varied parameter was adjusted along the span.	

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This volume describes the aerodynamic design details of the Phase V rotor. The Phase V rotor was designed to have less effective camber in the aft region of the airfoil than the baseline rotor. The hub region was kept essentially the same as the baseline rotor. The location of maximum airfoil thickness is 70% of length at the tip and 56% at the hub which is the same as the baseline rotor.

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VOLUME VI

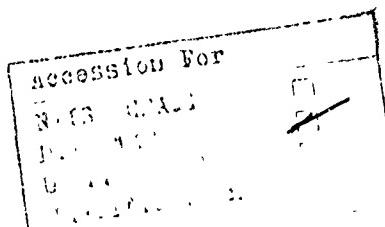
PHASE V ROTOR DESIGN

Foreword

This Final Technical Report was prepared by the Advanced Technology Programs Department, Aircraft Engine Business Group, General Electric Company, Evendale, Ohio for the United States Air Force Systems Command, Air Force Wright Aeronautical Laboratories Wright-Patterson Air Force Base, Ohio under Contract F33615-80-C-2059. The work was performed over a period of one year starting in September 1980. Effren Strain (Captain USAF) was the Air Force Project Engineer for this program.

This report describes the results of an effort to aerodynamically define five rotor designs, all parametrically related to a base line design which could be evaluated by future testing in order to define the sensitivity of transonic blade rows to several design variables.

For the General Electric Company Mr. D.E. Parker was the Technical Program Manager for this program. Mr. M.R. Simonson was the principal investigator. Mr. A.J. Bilhardt was the overall Program Manager.



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VOLUME VI

TABLE OF CONTENTS

SECTION		PAGE
XIX.	DESIGN OF PHASE V ROTOR	1
	1. Introduction	1
	2. Design Procedure	1
XX.	DETAILS OF PHASE V ROTOR DESIGN	11
	1. Circumferential Average Flow Solution	11
	2. Streamsurface Blade Coordinates	41
	3. Plane Section Blade Coordinates	62
XXI.	CONCLUSIONS	116
XXII.	REFERENCES	117

VOLUME VI

LIST OF ILLUSTRATIONS

FIGURE		PAGE
68.	Phase V Rotor Intrablade Work Distribution	3
69.	Phase V Rotor Static Pressure Distribution	4
70.	Phase V Rotor Streamsurface Tip Section Compared with Baseline Design	5
71.	Phase V Rotor Incidence Angle Versus Fractional Immersion	7
72.	Phase V Rotor Deviation Angle Versus Fractional Immersion	7
73.	Phase V Rotor Deviation Angle Minus Reference Deviation Angle Compared with Data Match	8
74.	Phase V Stator Incidence Angle Compared with Data Match	8
75.	Phase V Rotor Deviation Angle Versus Fractional Immersion	9
76.	Phase V Rotor Throat Margin Compared with Data Match	10
77.	Compressor Flowpath with Calculation Stations	12
78.	Stacked Phase V Rotor Streamsurface Sections	42
79.	Stacked Phase V Rotor Plane Sections	43

LIST OF SYMBOLS AND ABBR\VIATIONS

1. Used in Circumferential Average Flow Output Tables

STA	calculation station number	
WTF	total airflow	
PSIC	stream function (0 = tip (OD), 1 = hub (ID))	
Z	axial location	inches
R	radius	inches
PHI	streamline slope	degrees
CURV	streamline curvature \curvearrowleft = neg., \curvearrowright = pos.	1/inches
VM	meridional velocity	ft/sec
CU	absolute tangential velocity	ft/sec
ALPHAM	absolute flow angle on stream surface	degrees
MM	meridional Mach number	
SL	calculation streamline number	
BLDBLK	flow blockage factor	(free area - blocked area)/free area
PS	static pressure	psia
PT	total pressure	psia
TT	total temperature	degrees
BETAM	relative flow angle on stream surface	degrees
UREL	relative velocity	ft/sec
MREL	relative Mach number	
VABS	absolute velocity	ft/sec
MABS	absolute Mach number	
GAMMA	specific heat ratio	
PT-RAT	total pressure/inlet total pressure	
TT-RAT	total temperature/inlet total temperature	
RCU	radius x tangential velocity	in-ft/sec
CZ	axial velocity	ft/sec
PCT IMM	percent annulus immersion from tip (OD)	
RAD	average of leading and trailing edge streamline radii	inches
ACC PT RATIO	cumulative total pressure ratio	
ACC TT RATIO	cumulative total temperature ratio	

LIST OF SYMBOLS AND ABBREVIATIONS

1. Used in Circumferential Average Flow Output Tables (Cont'd)

AD.	adiabatic efficiency
POLY	polytropic efficiency
Axial VEL R	axial velocity ratio across blade row

2. Used in Stream Surface Blade Coordinate Tables

PT	point number	
PCT X	fraction of meridional distance from leading edge	
X	meridional coordinate on meanline	inches
Y	tangential coordinate on meanline	inches
B*M	meanline angle on stream surface	degrees
T(M)	thickness of blade perpendicular to meanline	inches
XS	meridional coordinate on suction surface	inches
YS	tangential coordinate on suction surface	inches
XP	meridional coordinate on pressure surface	inches
YP	tangential coordinate on pressure surface	inches

3. Used in Plane Section Coordinate Tables

Z	axial coordinate of stacking axis	inches
R	radius of coordinate system origin	inches
MU	tilt angle in axial direction	degrees
ETA	tilt angle in tangential direction	degrees
RHO	section height	inches
PT	point number	
ALPHA	axial coordinate	inches
ZETA*	meanline angle from axial	degrees
UPSILON	coordinate perpendicular to ALPHA and radius	inches
PCT AL	fraction of axial distance from leading edge	
T/C	local thickness/chord ratio	

SECTION XIX
DESIGN OF PHASE V ROTOR

1. INTRODUCTION

The best efficiency at the design speed for transonic rotors normally occurs near the "knee" of the pressure ratio - flow characteristics where the flow begins to decrease. [For the baseline rotor, the best design speed efficiency occurred at a pressure ratio that is about 8% higher than the test data point selected as the base for the designs carried out under this contract. The peak efficiency at the design speed was about 2 points higher than that measured at the base point.] The baseline point was selected for this work because it provides reasonable, stall margin. If it is thought of as an "operating line" point, then there is reason to think that an improvement in efficiency might be achieved at this "operating line" point by adjusting the effective camber so that the "knee" of the characteristics more nearly coincides with the operating line point. The term "effective camber" is loosely used to indicate the circulation capacity of the cascade, since the normal camber definition is not sufficient for cascades with nonstandard mean lines which may depart significantly from a circle arc.

The reduction in effective camber will not necessarily reduce the stall line at the design speed but may have a detrimental effect on the efficiency at reduced RPM operation. Currently there is inadequate definitive data to allow an assessment of the trade in a potentially higher design speed operating line efficiency against a potential loss in part speed efficiency.

2. DESIGN PROCEDURE

The "data match" circumferential average flow solution and the stream Surface Blade Sections (SBS) analysis of the baseline rotor previously described in Volume I were used as a starting point for the design of the Phase V rotor. For the Phase V rotor a higher efficiency was assumed for the outer 60% of the flow since it is believed that the Phase V blade will have increased efficiency in this region at the design pressure ratio. The rotor exit total pressure was maintained the same as the baseline rotor while the total temperature was reduced to reflect the assumed higher efficiency.

Since it was desired to keep the front portion of the airfoil essentially identical to the baseline rotor, the cordwise distribution of total pressure was kept identical to that of the data match of the baseline rotor. The work input (total temperature rise) was maintained the same as the data match of the baseline rotor in the front half of the rotor then departed smoothly from the baseline case so that the rotor exit total temperature was consistent with the assumed increased efficiency in the outer portion of the annulus.

The resulting streamline work input (as a fraction of the total streamline work) is plotted versus percent axial projection in Figure 68. The tip streamline is the one on the left. Each subsequent streamline is indexed to the right by the value of its stream function (fraction of the total flow from the tip). The dashed lines are lines of constant percent axial projection.

The resulting streamline static pressure distribution for the Phase I blade is compared with the data match of the baseline rotor on Figure 69.

To reduce the effective camber of the rotor, the departure angle distribution in the rear half of the airfoil was modified to concentrate the camber more heavily toward the trailing edge. This results in a larger stagger angle than the baseline rotor. A comparison of the Phase V tip airfoil with the baseline rotor is shown on Figure 70. The trailing edge angle was specified in the same manner as was used for all rotors designed under this contract. A modified version of Carter's Rule was used to calculate a reference deviation angle for the baseline rotor. This procedure converts the vector diagrams (from the data match calculations) to an equivalent two-dimensional set of vectors which would produce the same circulation as the actual blade taking into account the change in streamline radius and meriodional velocity. The difference between the deviation angle implied by the data match calculations and the reference deviation angle was then added to the reference deviation angle calculated from the modified Carter's Rule for the Phase V blade.

A method of characteristics computer program was used to analyze the flow in the cascade flow induction region for streamlines 3 and 6 to assure that the rotor would achieve the design flow. For other streamlines the difference between the suction surface angle and the "free-flow" streamline angle was compared with similar data from the data match calculations of the baseline rotor. This,

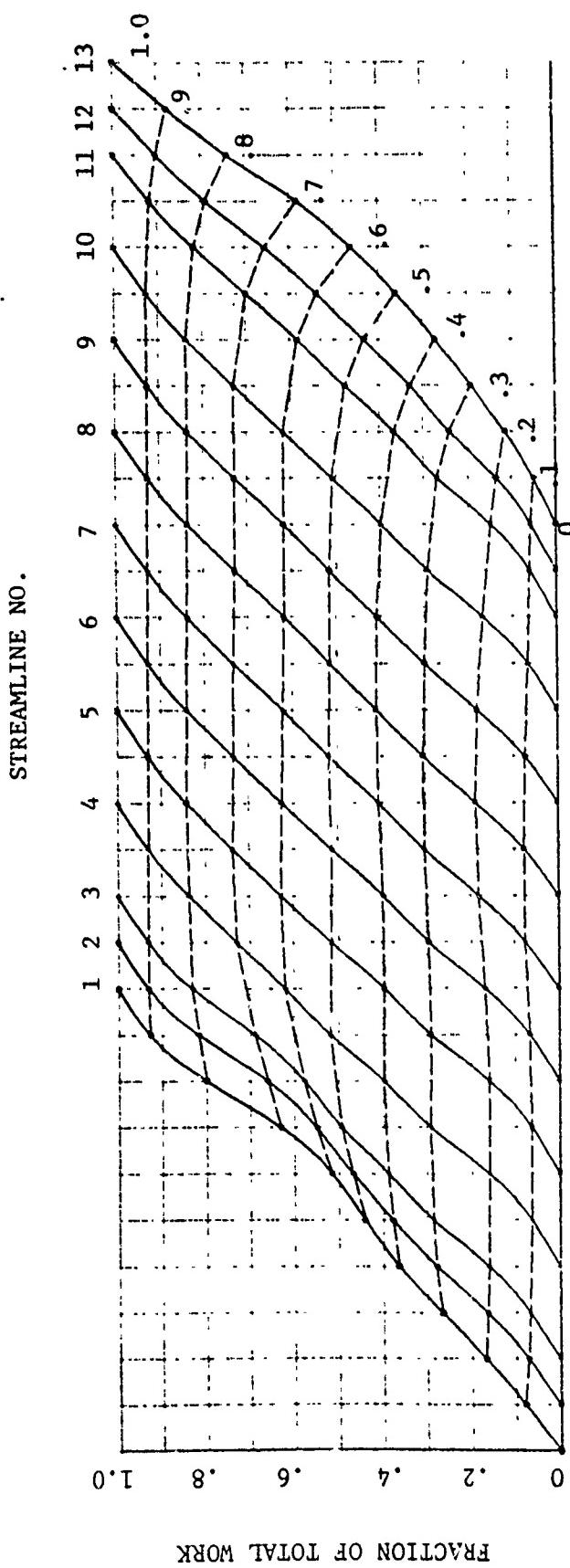


Figure 68. Rotor V Intrablade Work Distribution

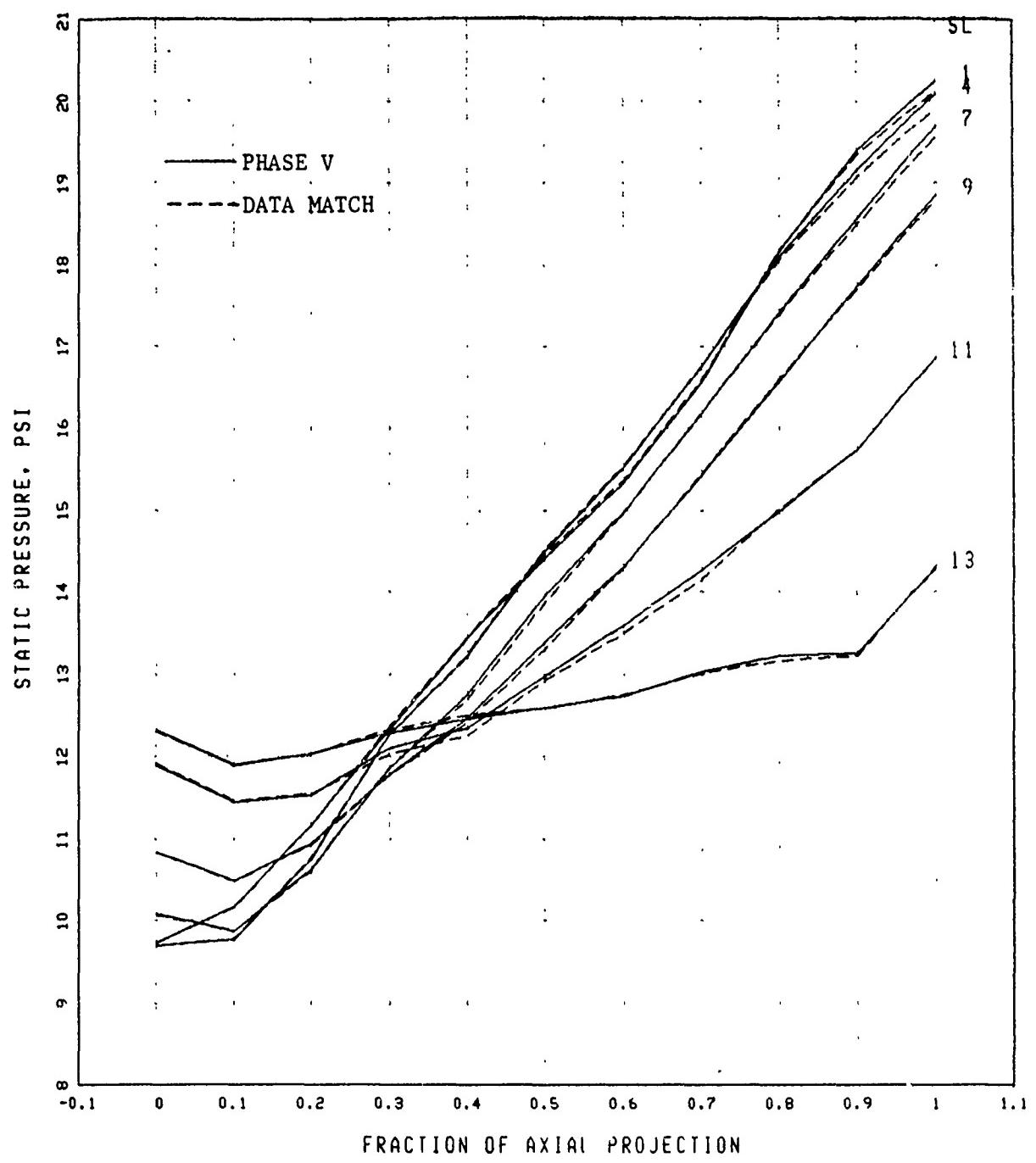


Figure 69. Phase V Rotor Static Pressure Distribution

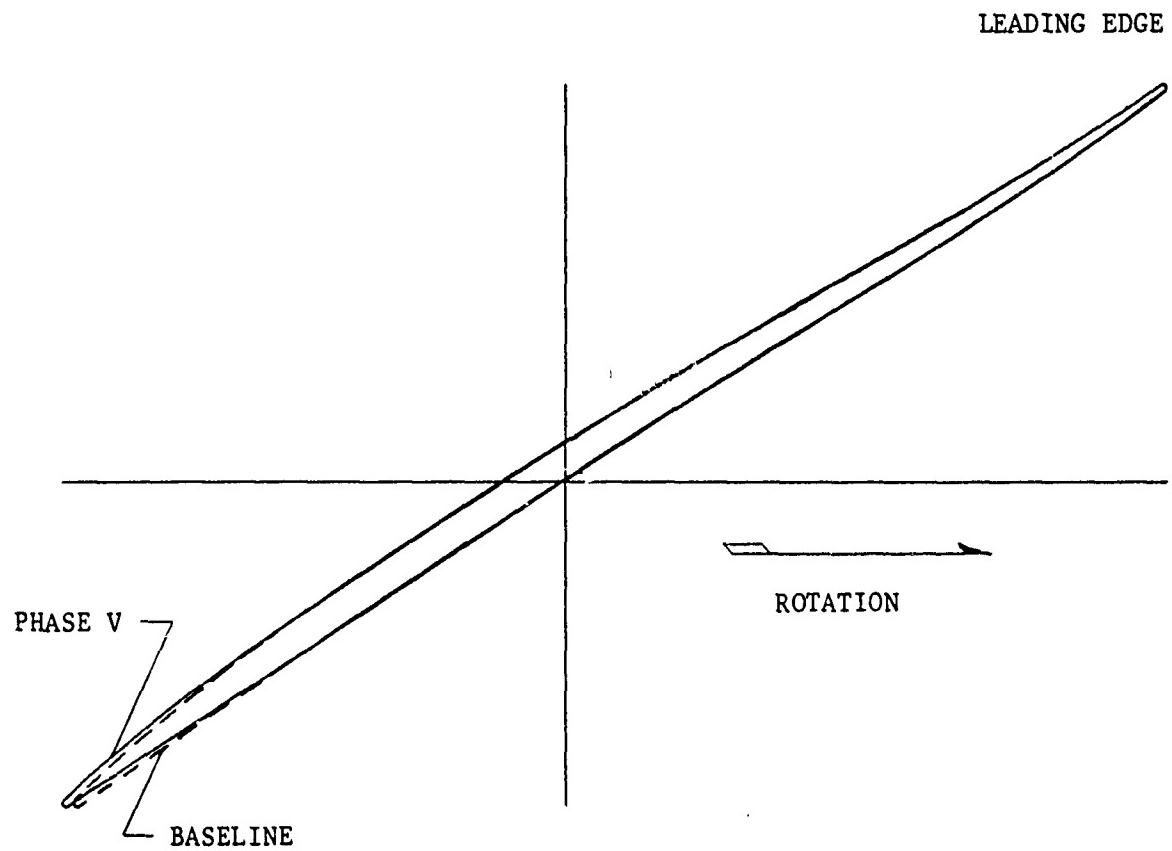


Figure 70. Phase V Rotor Streamsurface Tip Section
Compared with Baseline Design

then, was used as a guide in setting the suction surface angle in the flow induction region. This procedure was largely a formality for the Phase V rotor since the front portion of the airfoil was kept essentially the same as the baseline rotor. However, somewhat different radial blade forces resulting from somewhat different lean angles of the stacked blade made small difference in the radial distribution of streamtube convergence. This required small adjustments in blade shape to achieve the same flow induction capacity.

The radial variation of blade incidence angle was kept essentially the same as the data match of the baseline rotor and is shown in Figure 71.

The radial variation of the Phase V rotor deviation angle is shown in Figure 72 and the rotor deviation angle minus the reference deviation angle is compared with the data match of the baseline rotor in Figure 73.

The radial distribution of the calculated stator incidence angle is compared with the data match of the baseline rotor in Figure 74. The smaller calculated incidence angle in the outer portion for the Phase V rotor results primarily from the assumed higher efficiency in this region.

A plot of the departure angles (the difference between the local flow angle and blade meanline angle) for each streamsurface section is shown in Figure 75.

The throat margin was kept essentially identical to the data match of the baseline rotor and is shown in Figure 76. The throat margin for a streamsurface blade section is defined here as the percent of excess throat area over and above the minimum theoretical area required to pass the streamtube flow at a throat Mach number of 1.0 and assuming a total pressure loss equivalent to a normal shock at the upstream Mach number. In a rotor the effect of radius change (between the leading edge and throat) on the relative total enthalpy and pressure is included. As can be seen in Figure 76 the Phase I rotor throat margin is nearly identical to that of the data match of the baseline design.

Details of the Phase I rotor design are given in Section XXI.

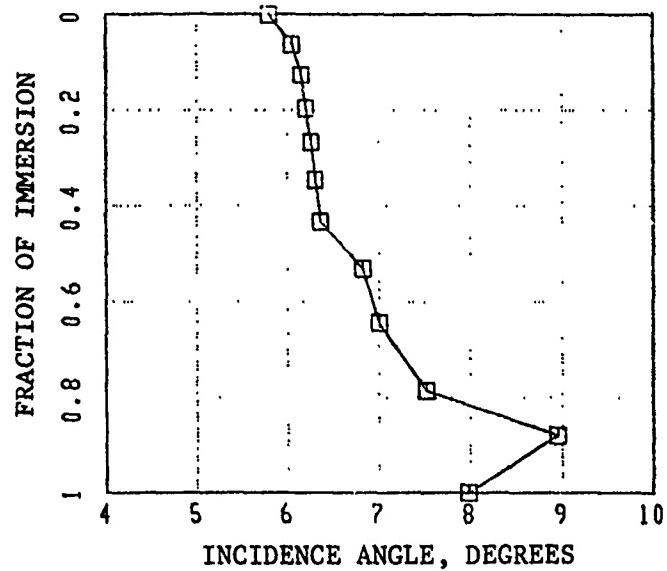


Figure 71. Phase V Rotor Incidence Angle Versus Fractional Immersion

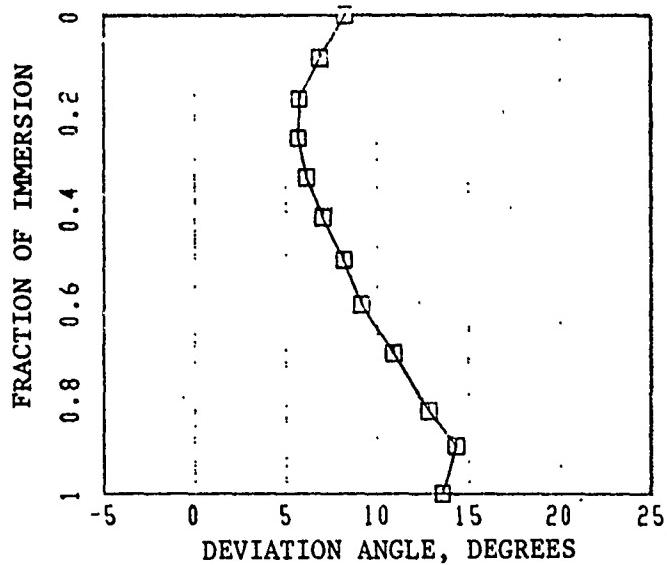


Figure 72. Phase V Rotor Deviation Angle Versus Fractional Immersion

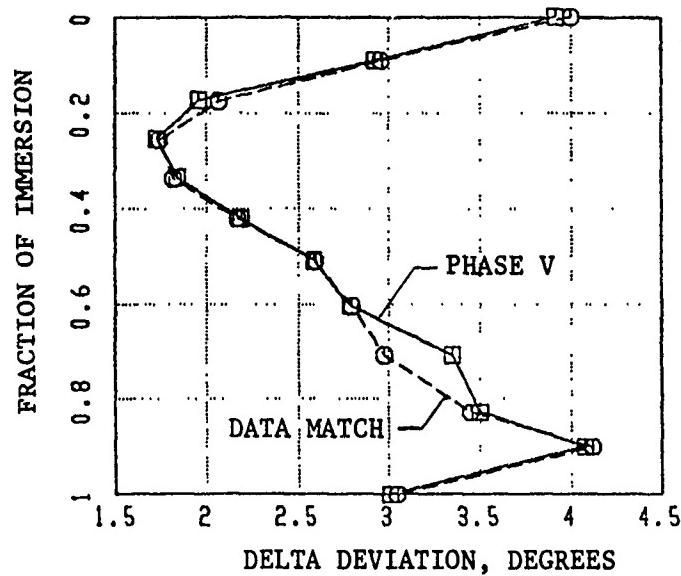


Figure 73. Phase V Rotor Deviation Angle Minus Reference Deviation Angle Compared With Data Match

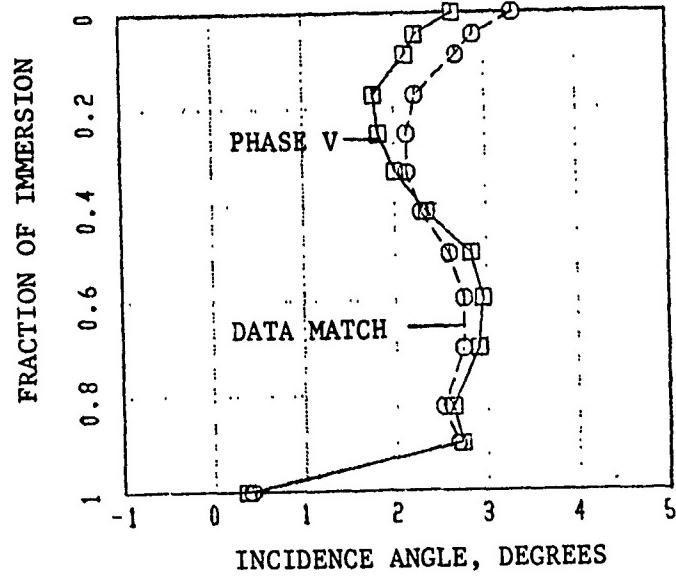


Figure 74. Phase V Stator Incidence Angle Compared With Data Match

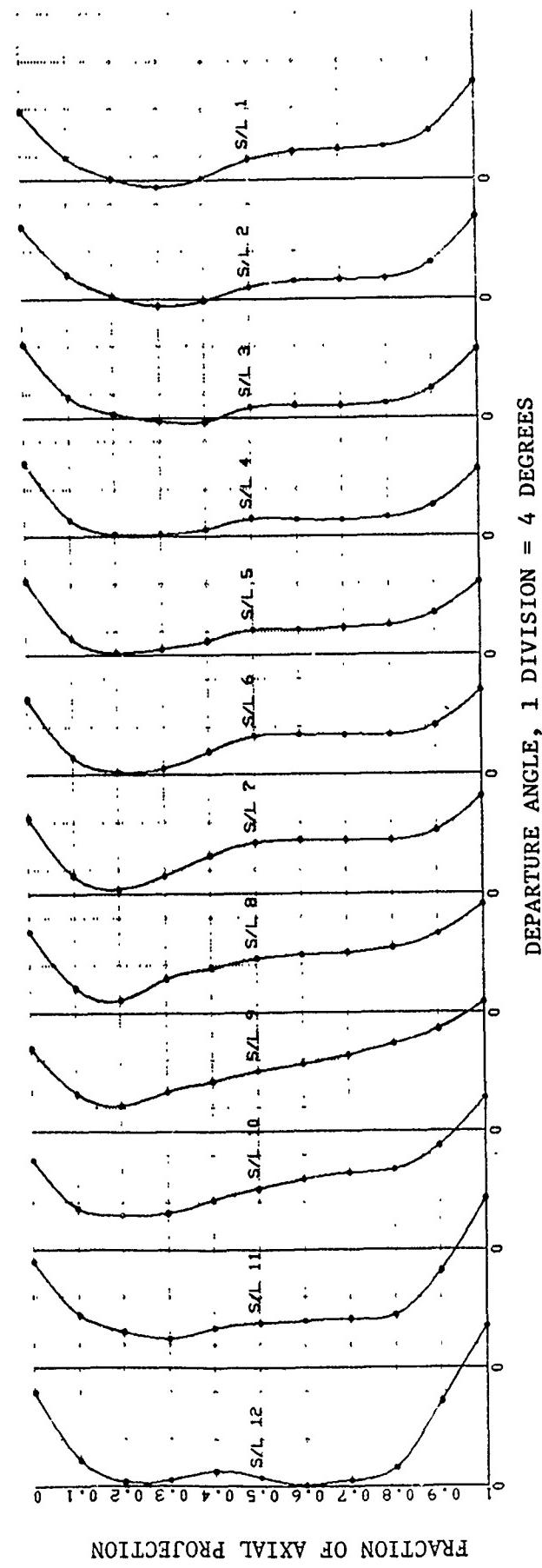


Figure 75. Phase V Rotor Deviation Angle Versus Fractional Immersion

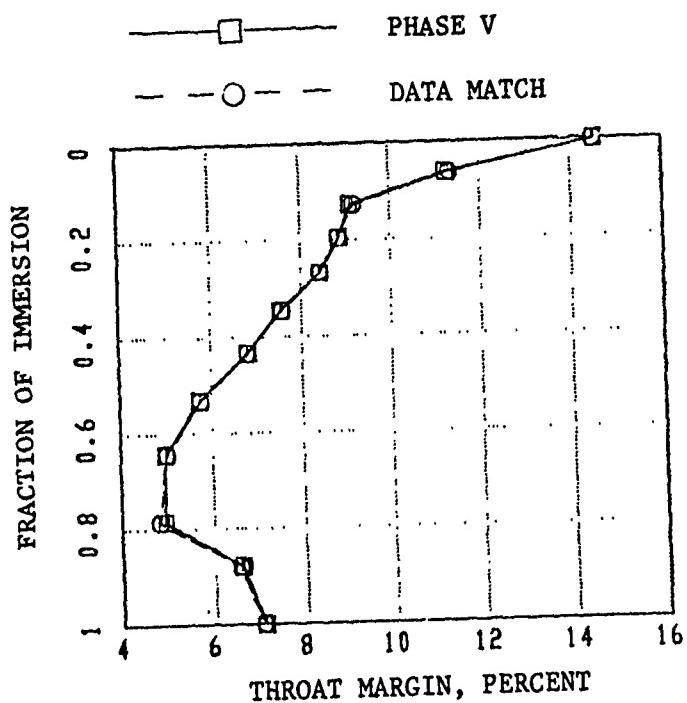


Figure 76. Phase V Rotor Throat Margin
Compared With Data Match

SECTION XX
DETAILS OF PHASE V ROTOR DESIGN

1. CIRCUMFERENTIAL AVERAGE FLOW SOLUTION

The following tabulation presents the detail results of the Phase I Rotor circumferential average flow computation. Each page of the tabulation gives results for one calculation station. Figure 77 shows the calculation station locations within the gas flowpath. At each calculation station various aerodynamic parameters are given on each of thirteen calculation streamlines. Also given are several mass averaged station flow properties. The Phase V rotor blade forces are included at the end of this section.

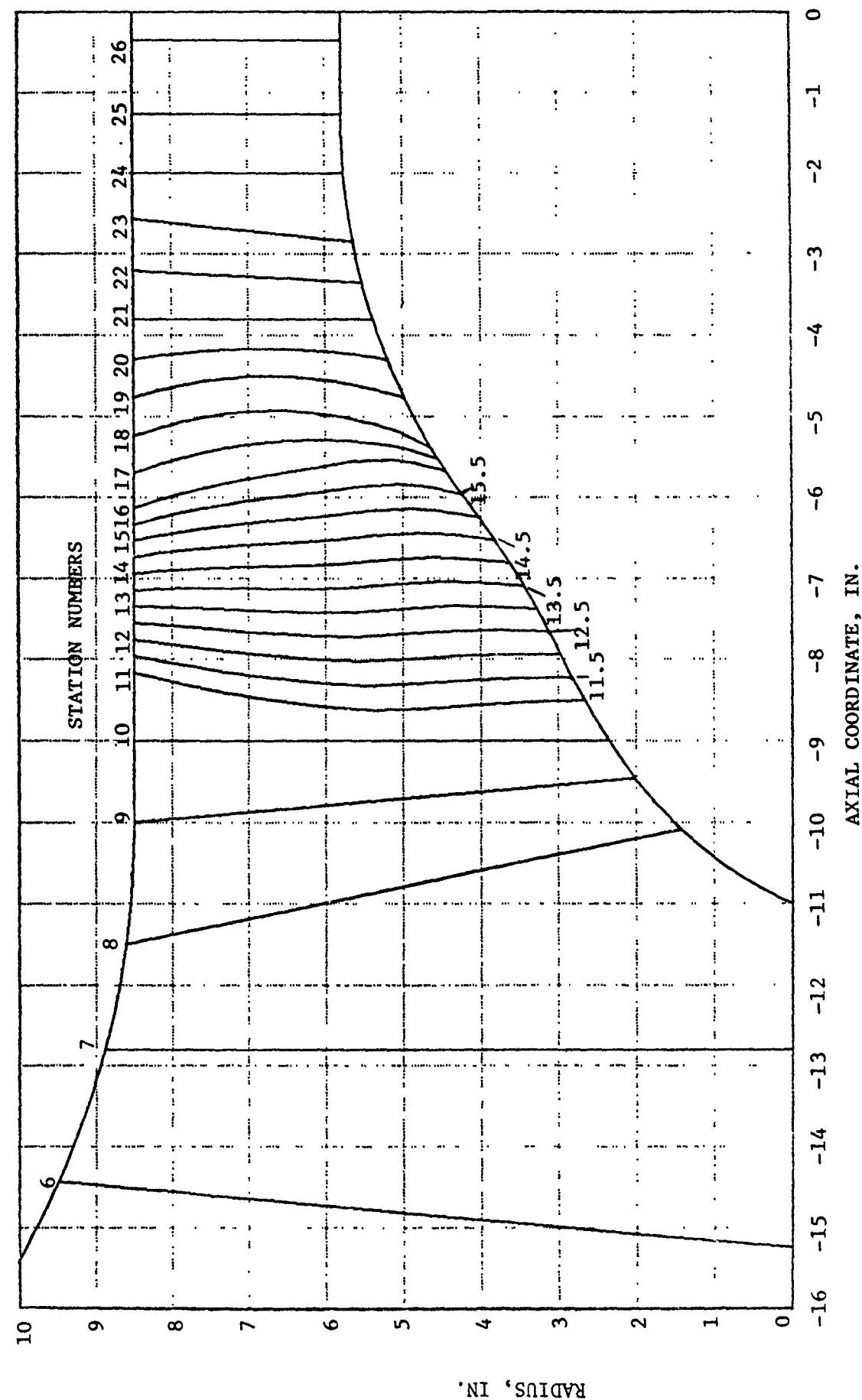


Figure 77. Compressor Flowpath With Calculation Stations

FREE
 STA= 5.000 AFLOW= 478.13 D+C=0.
 MTIP= 1 OPTY=FREE ITYPE=O INBR=0 D+H=0.
 WTF= 61.365 OPTX=OPP ABC=0.
 PSIC Z R PHI CURV VM CU ALPHAM MM
 0. -18.800 13.207 -50.10 0.0831 150.4 0. 0.135
 0.050 -18.800 12.564 -43.54 0. 181.0 0. 0.163
 0.100 -18.800 12.020 -40.31 0. 195.9 0. 0.176
 0.200 -18.800 11.027 -34.70 0. 218.6 0. 0.196
 0.300 -18.800 10.099 -29.90 0. 237.1 0. 0.213
 0.400 -18.800 9.193 -25.65 0. 252.4 0. 0.227
 0.500 -18.800 8.277 -21.78 0. 265.1 0. 0.239
 0.600 -18.800 7.319 -18.16 0. 275.9 0. 0.248
 0.700 -18.800 6.277 -14.68 0. 284.9 0. 0.257
 0.800 -18.800 5.083 -11.19 0. 292.5 0. 0.264
 0.900 -18.800 3.569 -7.34 0. 298.9 0. 0.270
 0.950 -18.800 2.516 -4.92 0. 301.6 0. 0.272
 1.000 -18.800 0.000 0. 0. 303.9 0. 0.274
 SL BLDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.997 14.510 14.696 518.7 86.31 2335.4 2.095 150.4 0.135
 2 0.997 14.427 14.696 518.7 85.33 2224.5 1.997 181.0 0.163
 3 0.997 14.382 14.696 518.7 84.72 2130.2 1.913 195.9 0.176
 4 0.997 14.305 14.696 518.7 83.59 1958.1 1.760 218.6 0.196
 5 0.997 14.237 14.696 518.7 82.42 1797.9 1.617 237.1 0.213
 6 0.997 14.177 14.696 518.7 81.16 1641.9 1.477 252.4 0.227
 7 0.997 14.124 14.696 518.7 79.71 1484.6 1.337 265.1 0.239
 8 0.997 14.077 14.696 518.7 77.94 1320.6 1.190 275.9 0.248
 9 0.997 14.037 14.696 518.7 75.58 1143.7 1.031 284.9 0.257
 10 0.997 14.002 14.696 518.7 71.94 943.5 0.850 292.5 0.264
 11 0.997 13.972 14.696 518.7 64.61 697.2 0.629 298.9 0.270
 12 0.997 13.959 14.696 518.7 55.81 536.8 0.484 301.6 0.272
 13 0.997 13.947 14.696 518.7 0.00 303.9 0.274 303.9 0.274

STA 5.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4015 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0 VM= 255.3 CZ= 233.4 MM=0.230 MABS=0.230 MREL=1.300

FREE									
INLET		STA= 6.000		AFLOW= 277.56		D+C=O.		D+H=O.	
WTF= 61.365		MTIP= 14		OPTX=DPP		OPTY=FREE ITYPE=O INBR=O		ABC=O.	
PSIC	Z	R	PHI	CURV	VM	CU	ALPHAM	MM	ABH=O.
0.050	-14.450	9.254	-24.10	-0.1028	507.6	0.	0.	0.	0.464
0.100	-14.470	9.020	-22.95	-0.0955	501.1	0.	0.	0.	0.458
0.200	-14.513	8.532	-20.65	-0.0825	489.4	0.	0.	0.	0.447
0.300	-14.558	8.010	-18.38	-0.0712	478.4	0.	0.	0.	0.436
0.400	-14.606	7.446	-16.13	-0.0614	467.8	0.	0.	0.	0.426
0.500	-14.660	6.829	-13.87	-0.0529	457.2	0.	0.	0.	0.416
0.600	-14.719	6.141	-11.59	-0.0455	446.4	0.	0.	0.	0.406
0.700	-14.787	5.352	-9.23	-0.0390	434.9	0.	0.	0.	0.395
0.800	-14.869	4.402	-6.73	-0.0330	422.1	0.	0.	0.	0.383
0.900	-14.978	3.142	-4.03	-0.0257	407.0	0.	0.	0.	0.369
0.950	-15.057	2.234	-2.57	-0.0190	398.2	0.	0.	0.	0.361
1.000	-15.250	0.000	0.	0.	387.1	0.	0.	0.	0.351
BLDBLK									
SL	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS	MABS
1	0.997	12.623	14.696	518.7	72.90	1750.4	1.601	514.7	0.471
2	0.997	12.676	14.696	518.7	72.73	1710.1	1.564	507.6	0.464
3	0.997	12.726	14.696	518.7	72.53	1668.8	1.525	501.1	0.458
4	0.997	12.812	14.696	518.7	71.99	1583.2	1.445	489.4	0.447
5	0.997	12.892	14.696	518.7	71.30	1492.2	1.361	478.4	0.436
6	0.997	12.968	14.696	518.7	70.40	1394.8	1.271	467.8	0.426
7	0.997	13.041	14.696	518.7	69.22	1288.9	1.174	457.2	0.416
8	0.997	13.116	14.696	518.7	67.61	1172.0	1.066	446.4	0.406
9	0.997	13.193	14.696	518.7	65.27	1039.7	0.945	434.9	0.395
10	0.997	13.277	14.696	518.7	61.48	884.2	0.803	422.1	0.383
11	0.997	13.374	14.696	518.7	53.72	687.8	0.624	407.0	0.369
12	0.997	13.429	14.696	518.7	44.72	560.4	0.508	398.2	0.361
13	0.997	13.496	14.696	518.7	-0.00	387.1	0.351	387.1	0.351
MASS AVERAGED PROPERTIES									
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RCU = 0.	VM = 455.6	MM=0	415	CZ= 438.5	MARS=0	415	MREF=1	1.120	

INLET STA= 7.000 FREE
 WTF= 61.365 MTIP= 27 AFLOW= 244.35 D*C=0.
 OPTX=DPP OPTY=REE ITYPE=O INBR=O ABC=0.
 PSIC Z R PHI CURV VM CU ALPHAM D*H=0.
 0. -12.800 8.880 -15.47 -0.0952 625.2 0. ABH=0.
 0. 0.050 -12.800 8.675 -14.65 -0.0872 617.8 0. MM
 0. 0.100 -12.800 8.464 -13.90 -0.0849 610.4 0. 0. 0.578
 0. 0.200 -12.800 8.021 -12.40 -0.0795 595.1 0. 0. 0. 0.564
 0. 0.300 -12.800 7.546 -10.87 -0.0736 579.6 0. 0. 0. 0.549
 0. 0.400 -12.800 7.032 -9.28 -0.0680 563.9 0. 0. 0. 0.533
 0. 0.500 -12.800 6.468 -7.60 -0.0629 547.6 0. 0. 0. 0.518
 0. 0.600 -12.800 5.837 -5.79 -0.0587 530.4 0. 0. 0. 0.502
 0. 0.700 -12.800 5.112 -3.79 -0.0560 511.3 0. 0. 0. 0.486
 0. 0.800 -12.800 4.237 -1.46 -0.0558 488.4 0. 0. 0. 0.468
 0. 0.900 -12.800 3.064 1.52 -0.0634 455.8 0. 0. 0. 0.446
 0. 0.950 -12.800 2.206 3.55 -0.0759 428.6 0. 0. 0. 0.415
 1. 1.000 -12.800 0.000 0. 0. 383.5 0. 0. 0. 0.390
 SL BLDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.998 11.714 14.696 518.7 68.25 1687.2 1.560 625.2 0.578
 2 0.998 11.779 14.696 518.7 68.02 1650.8 1.525 617.8 0.571
 3 0.998 11.843 14.696 518.7 67.77 1613.5 1.490 610.4 0.564
 4 0.998 11.974 14.696 518.7 67.20 1535.5 1.415 595.1 0.549
 5 0.998 12.105 14.696 518.7 66.48 1452.4 1.337 579.6 0.533
 6 0.998 12.235 14.696 518.7 65.56 1363.1 1.253 563.9 0.518
 7 0.998 12.366 14.696 518.7 64.37 1266.0 1.162 547.6 0.502
 8 0.998 12.502 14.696 518.7 62.76 1158.6 1.061 530.4 0.486
 9 0.998 12.649 14.696 518.7 60.46 1036.9 0.948 511.3 0.468
 10 0.998 12.819 14.696 518.7 56.85 893.0 0.815 488.4 0.446
 11 0.998 13.051 14.696 518.7 49.87 707.2 0.644 455.8 0.415
 12 0.998 13.234 14.696 518.7 42.25 579.1 0.526 428.6 0.390
 13 0.998 13.517 14.696 518.7 0.00 383.5 0.347 383.5 0.347

STA 7.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA= 1.4017 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= O. VM= 539.1 CZ= 532.1 MM= 0.495 MABS= 0.495 MREL= 1.109

INLET STA= 8.000 AFLOW= 224.07 FREE
 WTF= 61.365 MTIP= 40 D=C=O.
 PSIC Z OPTX=DPP OPTY=FREE ITYPE=O INBR=O ABC=O.
 R CURV ABH=O.
 0. -11.499 8.608 PHI VM CL ALPHAM MM
 0.050 -11.461 8.412 -7.49 -0.0953 712.0 0. 0.665
 0.100 -11.421 8.211 -6.86 -0.0909 693.8 0. 0.656
 0.200 -11.339 7.790 -5.59 -0.0815 675.7 0. 0.647
 0.300 -11.250 7.341 -4.25 -0.0744 658.7 0. 0.628
 0.400 -11.155 6.858 -2.77 -0.0695 642.1 0. 0.611
 0.500 -11.052 6.333 -1.09 -0.0668 625.1 0. 0.595
 0.600 -10.938 5.753 0.90 -0.0667 606.2 0. 0.578
 0.700 -10.809 5.096 3.37 -0.0696 583.8 0. 0.559
 0.800 -10.656 4.320 6.70 -0.0769 554.5 0. 0.538
 0.900 -10.459 3.318 12.11 -0.0935 510.5 0. 0.467
 0.950 -10.323 2.629 17.76 -0.1212 468.0 0. 0.427
 1.000 -10.086 1.421 47.99 0.1910 433.9 0. 0.394

FREE
 STA= 8.000 MASS AVERAGED PROPERTIES
 TT= 518.69 GAMMA=1.4017 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 612.1 CZ= 604.7 MM=0.566 MABS=0.566 MREL=1.140

INLET
 WTF = 61.365 I= 5 STA= 9.000 FREE
 PSIC Z OPTX=DPP MTIP= 53 AFLOW= 211.87 D+C=O.
 R PHI CURV VM CU ALPHAM MM
 0. -9.999 8.500 0. 0. 758.7 0.
 0. 0. 0. 0. 0. 0. 0.
 0.050 -9.984 8.315 -1.11 -0.0542 751.7 0.
 0.100 -9.968 8.125 -0.88 -0.0525 743.8 0.
 0.200 -9.935 7.728 -0.27 -0.0508 730.0 0.
 0.300 -9.900 7.305 0.61 -0.0511 715.9 0.
 0.400 -9.862 6.851 1.77 -0.0531 700.6 0.
 0.500 -9.821 6.359 3.28 -0.0573 682.8 0.
 0.600 -9.776 5.816 5.23 -0.0634 661.0 0.
 0.700 -9.725 5.201 7.76 -0.0713 633.1 0.
 0.800 -9.665 4.475 11.18 -0.0792 596.4 0.
 0.900 -9.587 3.542 16.60 -0.0812 546.1 0.
 0.950 -9.536 2.919 21.64 -0.0409 515.3 0.
 1.000 -9.460 2.011 38.65 0.1881 511.4 0.

SL BLDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.996 10.468 14.696 518.7 63.17 1681.0 1.580 758.7 0.713
 2 0.996 10.536 14.696 518.7 62.87 1648.7 1.548 751.7 0.706
 3 0.996 10.614 14.696 518.7 62.58 1615.2 1.515 743.8 0.698
 4 0.996 10.747 14.696 518.7 61.84 1546.8 1.448 730.0 0.683
 5 0.996 10.882 14.696 518.7 60.95 1474.5 1.378 715.9 0.669
 6 0.996 11.028 14.696 518.7 59.91 1397.4 1.303 700.6 0.653
 7 0.996 11.194 14.696 518.7 58.68 1313.6 1.223 682.8 0.635
 8 0.996 11.394 14.696 518.7 57.22 1220.8 1.133 661.0 0.614
 9 0.996 11.644 14.696 518.7 55.40 1115.1 1.032 633.1 0.586
 10 0.996 11.963 14.696 518.7 52.94 989.6 0.912 596.4 0.550
 11 0.996 12.378 14.696 518.7 48.86 830.0 0.762 546.1 0.501
 12 0.996 12.618 14.696 518.7 45.00 728.7 0.667 515.3 0.471
 13 0.996 12.648 14.696 518.7 34.76 622.4 0.569 511.4 0.468

STA 9.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA= 1.4018 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 663.8 C2= 655.4 MM= 0.617 MABS= 0.617 MREL= 1.178

INLET
 WTF = 61 STA= 10.000 MTIP = 66 AFLOW= 204.13 D+C=0. D+H=0.
 OPTX=DPP OPTY=FREE ITYPE=O INBR=O ABC=0. ABH=0.
 PSJC Z R
 0. -9.000 8.500 0. 0. 773.9 O. O. 0.729
 U.052 -9.000 8.317 0.24 0.0031 774.2 O. O. 0.729
 0.100 -9.000 8.130 0.64 0.0023 774.2 O. O. 0.729
 0.200 -9.000 7.742 1.42 0.0123 771.6 O. O. 0.726
 0.300 -9.000 7.333 2.46 0.0210 765.4 O. O. 0.720
 0.400 -9.000 6.896 3.84 0.0306 755.1 O. O. 0.709
 0.500 -9.000 6.425 5.60 0.0410 739.3 O. O. 0.693
 0.600 -9.000 5.906 7.92 0.0568 715.7 O. O. 0.669
 0.700 -9.000 5.320 10.81 0.0735 681.4 O. O. 0.634
 0.800 -9.000 4.626 14.42 0.0870 634.5 O. O. 0.587
 0.900 -9.000 3.734 19.55 0.0853 575.2 O. O. 0.529
 0.950 -9.000 3.141 23.72 0.0842 535.7 O. O. 0.491
 1.000 -9.000 2.340 32.46 0.1922 543.6 O. O. 0.499

SL **BLDBLK** **PS** **PT** **TT** **BETAM** **VREL** **MREL** **VABS** **MABS**
 1 0.994 10.317 14.696 518.7 62.71 1687.9 1.589 773.9 0.729
 2 0.994 10.315 14.696 518.7 62.19 1659.4 1.563 774.2 0.729
 3 0.994 10.315 14.696 518.7 61.65 1630.3 1.535 774.2 0.729
 4 0.994 10.341 14.696 518.7 60.55 1569.1 1.477 771.5 0.726
 5 0.994 10.402 14.696 518.7 59.40 1503.4 1.414 765.4 0.720
 6 0.994 10.503 14.696 518.7 58.18 1432.2 1.345 755.1 0.709
 7 0.994 10.657 14.696 518.7 56.89 1353.5 1.269 739.3 0.693
 8 0.994 10.884 14.696 518.7 55.52 1264.4 1.182 715.7 0.669
 9 0.994 11.207 14.696 518.7 54.03 1160.0 1.079 681.4 0.634
 10 0.994 11.633 14.696 518.7 52.14 1033.9 0.957 634.5 0.587
 11 0.994 12.142 14.696 518.7 48.88 874.6 0.805 575.2 0.529
 12 0.994 12.460 14.696 518.7 45.98 770.9 0.707 535.7 0.491
 13 0.994 12.398 14.696 518.7 37.22 682.6 0.626 543.6 0.499

STA = 10.000 **MASS AVERAGED PROPERTIES**
 PT = 14.696 TT = 518.69 GAMMA = 1.4018 PT-RAT = 1.000 TT-RAT = 1.000
 RCU = 0. VM = 705.9 CZ = 694.5 MM = 0.660 MABS = 0.660 MREL = 1.217

ROTOR1	WTF=	I =	7	STA=	11.000	AFLOW=	197.41	LE ROTOR							
								M TIP=	79	O PTY=FREE	I TYPE=4	INBR=3	D=C=O.	D*H=O.	ABC=O.
PSIC	61.365	OPTX=DPP	Z R	PHI	CURV	VM	CU	ALPHAM	MM						
0	-8.166	8.500	0.	0.	832.8	0.	0.	0.	0.	0.	0.	0.	0.791		
0.050	-8.204	8.322	0.38	-0.0049	834.4	0.	0.	0.	0.	0.	0.	0.	0.793		
0.100	-8.242	8.140	0.75	-0.0030	835.3	0.	0.	0.	0.	0.	0.	0.	0.794		
0.200	-8.322	7.762	1.73	-0.0033	835.2	0.	0.	0.	0.	0.	0.	0.	0.793		
0.300	-8.397	7.362	3.02	-0.0110	829.7	0.	0.	0.	0.	0.	0.	0.	0.788		
0.400	-8.466	6.936	4.61	-0.0196	817.7	0.	0.	0.	0.	0.	0.	0.	0.775		
0.500	-8.531	6.475	6.63	-0.0351	797.1	0.	0.	0.	0.	0.	0.	0.	0.753		
0.600	-8.592	5.968	9.19	-0.0510	764.7	0.	0.	0.	0.	0.	0.	0.	0.719		
0.700	-8.624	5.397	12.32	-0.0638	720.6	0.	0.	0.	0.	0.	0.	0.	0.674		
0.800	-8.604	4.735	16.21	-0.0649	669.3	0.	0.	0.	0.	0.	0.	0.	0.622		
0.900	-8.548	3.904	21.67	-0.0681	603.7	0.	0.	0.	0.	0.	0.	0.	0.557		
0.950	-8.526	3.361	25.85	-0.0582	560.0	0.	0.	0.	0.	0.	0.	0.	0.514		
1.000	-8.507	2.653	31.20	0.1471	553.1	0.	0.	0.	0.	0.	0.	0.	0.508		
SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS						
1	0.990	9.723	14.696	518.7	60.96	1715.7	1.629	832.8	0.791						
2	0.990	9.707	14.696	518.7	60.40	1689.1	1.604	834.4	0.793						
3	0.990	9.697	14.696	518.7	59.82	1661.6	1.579	835.3	0.794						
4	0.990	9.699	14.696	518.7	58.63	1604.3	1.524	835.2	0.793						
5	0.990	9.755	14.696	518.7	57.44	1541.6	1.463	829.7	0.788						
6	0.990	9.878	14.696	518.7	56.26	1472.0	1.395	817.7	0.775						
7	0.990	10.085	14.696	518.7	55.10	1393.2	1.316	797.1	0.753						
8	0.990	10.409	14.696	518.7	54.02	1301.5	1.224	764.7	0.719						
9	0.990	10.837	14.696	518.7	52.89	1194.3	1.117	720.6	0.674						
10	0.990	11.319	14.696	518.7	51.31	1070.6	0.995	669.3	0.622						
11	0.990	11.901	14.696	518.7	48.77	916.1	0.845	603.7	0.557						
12	0.990	12.266	14.696	518.7	46.65	815.8	0.749	560.0	0.514						
13	0.990	12.322	14.696	518.7	40.25	724.6	0.665	553.1	0.508						

STA 11.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4018 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VCU= 755.7 CZ= 741.5 MM=0.712 MABS=0.712 MREL=1.260

ROTOR1		STA= 11.500	AFLOW= 181.06	D=C=O.	IN ROTOR	
WTF=	WTIP=	92	ITYPE=5	INBR=3	ABC=O.	D*H=O.
PSIC	Z	OPTX=TT	OPTY=PT	CURV	CU	ABH=O.
		R	PHI			MM
0.	-7.963	8.500	0.	0.	44.8	3.03
0.050	-7.991	8.323	0.24	0.0275	40.5	2.72
0.100	-8.020	8.143	0.59	0.0291	38.3	2.55
0.200	-8.083	7.769	1.64	0.0166	36.5	2.38
0.300	-8.143	7.376	3.10	-0.0005	37.1	2.39
0.400	-8.198	6.958	4.88	-0.0166	38.6	2.61
0.500	-8.251	6.509	7.08	-0.0209	47.8	3.12
0.600	-8.301	6.017	9.72	-0.0109	51.7	3.46
0.700	-8.324	5.465	12.91	-0.0026	53.6	3.75
0.800	-8.299	4.826	16.76	0.0046	52.8	3.91
0.900	-8.247	4.027	22.18	0.0139	57.0	4.58
0.950	-8.231	3.507	25.89	0.0546	62.3	5.25
1.000	-8.224	2.817	29.07	0.0800	653.8	6.02
					69.0	0.603
SL	BUDBLK	PS	PT	TT	BETAM	VREL
1	0.956	10.153	15.467	529.9	59.77	1684.3
2	0.956	10.071	15.414	528.6	59.19	1663.0
3	0.955	9.962	15.391	527.9	58.41	1641.8
4	0.952	9.766	15.379	527.0	56.69	1596.9
5	0.948	9.668	15.397	526.7	54.96	1544.5
6	0.943	9.705	15.451	527.0	53.26	1482.0
7	0.935	9.868	15.565	527.9	51.41	1408.4
8	0.925	10.136	15.584	527.9	49.76	1323.2
9	0.913	10.486	15.545	527.3	48.03	1225.0
10	0.897	10.901	15.440	526.2	45.99	1110.8
11	0.879	11.445	15.365	525.4	42.57	966.1
12	0.850	11.734	15.328	525.1	39.38	877.2
13	0.812	11.892	15.250	524.4	33.22	781.4

STA 11.500 MASS AVERAGED PROPERTIES
 PT= 15.448 TT= 527.04 GAMMA=1.4018 PT-RAT= 1.051 TT-RAT= 1.016
 RCU= 283.5 VM= 829.3 CZ= 812.2 MM=0.781 MABS=0.783 MREL=1.276

ROTOR1		STA= 12.000	AFLOW= 170.54	D*C=O.	IN ROTOR
WTF=	61.365	MTIP=105	ITYPE=5 INBR=3	ABC=O.	D*H=O.
PSIC	Z R	OPTX=PT	CURV VM	CU ALPHAM	ABH=O.
0.	-7.759 8.500	PHI 0.	815.6 94.9	6.64 0.754	
0.050	-7.778 8.323	0.15 0.0369	822.9 93.4	6.47 0.762	
0.100	-7.798 8.144	0.13 0.0426	832.9 91.7	6.29 0.773	
0.200	-7.844 7.775	1.36 0.0241	856.0 92.0	6.13 0.798	
0.300	-7.889 7.390	3.09 0.0018	870.5 93.4	6.13 0.814	
0.400	-7.931 6.982	5.10 -0.0119	882.1 101.8	6.58 0.826	
0.500	-7.972 6.545	7.34 -0.0112	887.5 114.1	7.32 0.831	
0.600	-8.010 6.067	9.83 -0.0026	879.0 124.6	8.07 0.822	
0.700	-8.024 5.534	12.80 0.0142	858.4 130.7	8.66 0.801	
0.800	-7.995 4.918	16.58 0.0151	823.6 132.6	9.15 0.766	
0.900	-7.946 4.149	21.93 0.0129	772.4 136.8	10.04 0.716	
0.950	-7.936 3.647	25.27 0.0115	737.3 141.8	10.89 0.681	
1.000	-7.941 2.971	28.21 0.0136	690.1 149.3	12.21 0.635	
SL	BLDBLK	PS	PT	TT	VREL
1	0.933	11.159	16.356	542.4 59.87	1624.7 1.502
2	0.933	11.092	16.382	541.6 59.11	1602.9 1.485
3	0.932	10.983	16.392	540.7 58.24	1582.4 1.469
4	0.928	10.762	16.459	539.8 56.23	1540.0 1.436
5	0.922	10.620	16.507	539.0 54.28	1491.1 1.395
6	0.912	10.580	16.658	539.6 52.03	1433.8 1.343
7	0.898	10.623	16.837	540.7 49.55	1367.9 1.281
8	0.881	10.759	16.916	540.9 47.11	1291.4 1.208
9	0.863	10.937	16.854	540.0 44.58	1205.1 1.125
10	0.840	11.177	16.654	537.9 41.75	1104.0 1.027
11	0.818	11.525	16.388	535.4 37.62	975.3 0.904
12	0.776	11.756	16.222	533.9 34.24	891.9 0.824
13	0.733	12.025	15.981	531.8 28.51	785.3 0.723

PT= 16.585 TT= 539.12 GAMMA=1.4018 PT-RAT= 1.129 TT-RAT= 1.039
RCU= 694.0 VM= 841.8 C2= 823.9 MM=0.785 MABS=0.792 MREL=1.231

ROTOR 1		STA = 12.500	AFLOW = 162.19	D+C=0.	IN ROTOR
WRF =	I=10	WTIP=118	ITYPE=5	INBR=3	D+H=0.
PSIC	Z	OPTX=TT	OPTY=PT	CLU	ABH=0.
0.	-7.556	8.500	0.	0.	MM
0.	-7.565	8.322	-0.31	-0.0117	ALPHAM
0.050	-7.576	8.144	-0.15	0.0009	10.98
0.100	-7.606	7.780	1.02	0.0251	0.704
0.200	-7.536	7.4C3	2.87	0.0291	11.34
0.300	-7.664	7.006	4.98	0.0278	0.717
0.400	-7.692	6.556	7.18	0.0309	162.5
0.500	-7.719	6.111	9.64	0.0247	11.52
0.600	-7.724	5.601	12.59	0.0100	0.726
0.700	-7.690	5.008	16.36	0.0097	168.9
0.800	-7.645	4.269	21.60	0.0226	11.62
0.900	-7.641	3.786	25.06	0.0104	0.746
0.950	-7.658	3.123	28.51	-0.0461	17.06
1.000					0.763
					0.781
					0.798
					0.806
					12.38
					0.801
					12.99
					0.798
					13.81
					0.798
					15.10
					0.772
					16.84
					0.734
					17.54
					0.706
					0.653
					18.37
					0.653
SL	BLDBLK	PS	PT	TT	MABS
1	0.912	12.329	17.377	556.4	VABS
2	0.911	12.345	17.616	557.4	1.413
3	0.910	12.346	17.780	557.7	790.1
4	0.906	12.261	18.020	557.2	0.731
5	0.898	12.129	18.118	555.9	804.3
6	0.886	11.997	18.256	555.4	1.390
7	0.868	11.858	18.404	555.6	814.3
8	0.849	11.756	18.432	555.0	0.741
9	0.829	11.780	14.357	553.7	835.1
10	0.802	11.941	16.307	552.0	0.762
11	0.776	12.101	17.869	549.0	850.5
12	0.728	12.139	17.482	545.7	0.779
13	0.683	12.289	16.876	540.4	0.798
					0.817
					887.5
					0.828
					896.6
					0.821
					889.8
					0.800
					867.7
					0.767
					833.7
					0.741
					805.5
					0.688
					0.688

STA 12.500 MASS AVERAGED PROPERTIES
 PT= 18.062 TT= 554.06 GAMMA=1.4017 PT-RAT= 1.229 TT-RAT= 1.068
 RCU= 1201.5 VM= 829.1 CZ= 811.3 MM=0.761 MABS=0.782 MREL=1.157

ROTOR1
 I=11 STA= 13.000 AFLOW= 155.54 IN Rotor
 WTF= 61.365 OPTX=TT ITYPE=PT INBR=3 D+C=0.
 PSIC Z R OPTY=PT CURV VM CU ALPHAM D+H=0.
 0. -7.352 8.500 O. 0. 740.6 206.0 15.55 0.662
 0. 0.50 -7.352 8.32 -0.46 0.0364 759.6 214.9 15.80 0.680
 0. 1.00 -7.354 8.143 -0.43 0.0444 777.7 221.2 15.87 0.697
 0. 200 -7.367 7.784 0.62 0.0337 808.9 229.6 15.84 0.729
 0. 300 -7.382 7.415 2.45 0.0279 826.4 232.6 15.72 0.748
 0. 400 -7.397 7.028 4.51 0.0335 844.1 239.8 15.86 0.767
 0. 500 -7.413 6.615 6.79 0.0182 862.2 253.9 16.41 0.786
 0. 600 -7.429 6.166 9.28 0.0178 871.3 269.5 17.19 0.796
 0. 700 -7.425 5.668 12.25 0.0285 872.7 285.4 18.11 0.799
 0. 800 -7.386 5.096 16.11 0.0177 861.6 302.3 19.33 0.790
 0. 900 -7.344 4.387 21.34 0.0047 829.3 320.0 21.10 0.761
 0. 950 -7.346 3.923 25.14 -0.0185 801.1 321.6 21.87 0.735
 1.000 -7.375 3.281 29.92 -0.1052 736.3 318.7 23.41 0.674

SL BLDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.893 13.441 18.431 570.2 60.21 1490.9 1.332 768.8 0.687
 2 0.893 13.433 18.742 571.3 58.79 1465.7 1.311 789.4 0.706
 3 0.892 13.375 18.981 571.7 57.39 1443.3 1.294 808.6 0.725
 4 0.887 13.223 19.345 571.3 54.74 1401.1 1.262 840.8 0.757
 5 0.880 13.077 19.489 569.4 52.47 1356.7 1.227 858.5 0.777
 6 0.866 12.913 19.630 568.3 49.85 1309.0 1.189 877.5 0.797
 7 0.848 12.743 19.804 568.1 46.65 1256.0 1.144 898.8 0.819
 8 0.828 12.605 19.873 567.6 43.21 1195.5 1.092 912.0 0.833
 9 0.805 12.472 19.817 566.3 39.32 1128.1 1.033 918.2 0.841
 10 0.777 12.384 19.608 564.0 34.72 1048.2 0.961 913.1 0.837
 11 0.748 12.351 19.126 560.0 28.71 945.6 0.867 888.9 0.815
 12 0.702 12.298 18.609 555.8 24.84 882.8 0.810 863.3 0.792
 13 0.655 12.463 17.848 549.5 19.47 780.9 0.715 802.3 0.735

STA 13.000 MASS AVERAGED PROPERTIES
 PT= 19.385 TT= 566.74 GAMMA= 1.4016 PT-RAT= 1.319 TT-RAT= 1.093
 RCU= 1632.4 VM= 830.2 CZ= 812.2 MM= 0.755 MABS= 0.792 MREL= 1.110

ROTOR1
 WTF= 61.365 I=12 STA= 13.500 IN ROTOR
 OPTX=TT MTIP=1.44 AFLOW= 151.15 D*C=0.
 R OPTY=PT 1 TYPE=5 INBR=3 ABC=0. D*H=0.
 PSIC Z PHI CURV VM CU ALPHAM MM
 0 -7.148 8.500 0. 0. 702.8 249.9 19.58 0.620
 0.050 -7.139 8.319 -0.57 -0.0184 726.8 266.0 20.10 0.641
 0.100 -7.132 8.140 -0.63 -0.0142 748.0 281.0 20.59 0.661
 0.200 -7.128 7.786 0.28 0.0155 781.5 298.6 20.91 0.693
 0.300 -7.129 7.425 2.01 0.0327 800.7 302.1 20.67 0.713
 0.400 -7.130 7.048 4.10 0.0203 816.6 308.2 20.68 0.731
 0.500 -7.133 6.647 6.37 0.0338 835.9 321.6 21.05 0.751
 0.600 -7.138 6.213 8.87 0.0314 851.8 335.4 21.49 0.769
 0.700 -7.125 5.732 11.84 0.0179 860.1 355.2 22.44 0.779
 0.800 -7.081 5.183 15.91 0.0043 854.6 379.6 23.95 0.776
 0.900 -7.043 4.505 21.43 -0.0142 829.3 405.9 26.08 0.755
 0.950 -7.051 4.063 25.60 -0.0308 809.8 409.9 26.85 0.739
 1.000 -7.092 3.450 31.86 -0.0937 762.7 402.5 27.82 0.697

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.885	14.429	19.294	581.2	60.65	1434.1	1.264	745.9	0.658
2	0.885	14.481	19.792	583.8	58.84	1404.7	1.240	774.0	0.683
3	0.884	14.526	20.260	586.0	57.08	1376.5	1.216	799.1	0.706
4	0.880	14.508	20.913	587.1	53.99	1329.3	1.179	836.6	0.742
5	0.872	14.363	21.116	584.7	51.54	1287.4	1.147	855.8	0.763
6	0.857	14.189	21.236	582.6	48.89	1241.8	1.111	872.8	0.781
7	0.839	13.954	21.382	581.6	45.53	1193.2	1.072	895.6	0.805
8	0.818	13.642	21.361	580.0	41.78	1142.2	1.031	915.4	0.826
9	0.795	13.388	21.326	578.6	37.34	1081.8	0.980	930.5	0.843
10	0.768	13.192	21.157	576.6	32.05	1008.3	0.916	935.2	0.850
11	0.738	12.986	20.634	572.5	25.14	916.0	0.834	923.3	0.841
12	0.699	12.746	20.000	567.7	20.77	866.0	0.790	907.6	0.828
13	0.649	12.590	18.978	559.6	15.14	790.1	0.722	862.4	0.788

STA 13.500 MASS AVERAGED PROPERTIES
 PT= 20.856 TT= 580.10 GAMMA= 1.4015 PT-RAT= 1.419 TT-RAT= 1.118
 RCU= 2087.0 VM= 811.9 CZ= 793.8 MM=0 729 MABS=0.789 MREL=1.049

ROTOR 1
 WTF = 61.365 I=13 OPTX=TT STA = 14.000 MTIP=157 AFLOW= 147.59 IN ROTOR
 PSIC Z R DTYPE=PT 1TYPE=5 INBR=3 D=C=O.
 PHI CURV VM CU ALPHAM MM ABH=O.
 0. -6.945 8.500 0. 0. 671.9 291.6 23.46 0.586
 0.050 -6.926 8.3117 -0.33 -0.0197 700.3 313.1 24.09 0.611
 0.100 -6.910 8.138 -0.37 -0.0255 724.5 329.6 24.46 0.633
 0.200 -6.890 7.787 0.30 -0.0181 764.4 358.1 25.10 0.670
 0.300 -6.875 7.433 1.75 0.0039 783.5 368.2 25.17 0.690
 0.400 -6.863 7.066 3.70 0.0316 800.3 374.8 25.10 0.708
 0.500 -6.853 6.677 5.88 0.0271 919.2 384.4 25.14 0.728
 0.600 -6.847 6.257 8.43 0.0210 834.9 399.4 25.56 0.746
 0.700 -6.825 5.794 11.59 0.0110 843.2 421.9 26.58 0.756
 0.800 -6.777 5.270 15.91 -0.0047 845.7 455.4 28.30 0.762
 0.900 -6.742 4.624 21.83 -0.0286 826.0 484.4 30.39 0.747
 0.950 -6.756 4.206 26.35 -0.0486 811.6 492.1 31.23 0.737
 1.000 -6.809 3.632 33.48 -0.0749 785.6 490.0 31.95 0.717

IN ROTOR
 SL BLDblk PS PT TT BETAM VREL MREL VABS MABS
 1 0.878 15.334 20.180 591.6 60.92 1382.7 1.206 732.5 0.639
 2 0.879 15.403 20.801 595.3 58.76 1350.4 1.178 767.1 0.669
 3 0.879 15.463 21.364 597.6 56.79 1322.7 1.155 796.0 0.695
 4 0.874 15.519 22.326 600.7 53.05 1271.5 1.114 844.1 0.740
 5 0.866 15.475 22.736 599.2 50.29 1226.4 1.079 865.7 0.762
 6 0.852 15.292 22.896 596.6 47.46 1183.7 1.047 883.7 0.782
 7 0.834 14.974 22.935 594.2 44.10 1140.8 1.014 904.9 0.804
 8 0.814 14.624 22.911 592.2 40.17 1092.6 0.976 925.5 0.827
 9 0.793 14.315 22.869 590.6 35.46 1035.2 0.929 942.9 0.846
 10 0.770 13.989 22.803 589.3 29.30 969.8 0.873 960.5 0.865
 11 0.739 13.590 22.174 584.6 21.87 890.0 0.805 957.6 0.866
 12 0.713 13.221 21.469 579.6 17.13 849.2 0.771 949.1 0.862
 13 0.662 12.738 20.324 571.1 10.87 800.0 0.730 925.9 0.845

STA 14.000 MASS AVERAGED PROPERTIES
 PT = 22.329 TT = 592.76 GAMMA = 1.4014 PT-RAT = 1.519 TT-RAT = 1.143
 RCU = 25117.6 VM = .37.4 CZ = 779.0 MM = 0.709 MABS = 0.793 MREL = 0.996

ROTOR 1		I=14	STA= 14.500	AFLOW= 145.34	IN ROTOR		
WTF=	61.365	OPTX=TT	OPTY=PT	ITYPE=5	INBR=3	D+C=0.	
PSIC	Z	R	PHI	CURV	VM	ABC=0.	
0.	-6.741	8.500	0.	0.	637.7	29.23	0.548
0.050	-6.713	8.316	-0.15	-0.0099	666.5	375.4	29.39
0.100	-6.688	8.138	-0.08	-0.0212	691.3	392.8	29.61
0.200	-6.651	7.788	0.54	-0.0167	735.1	420.5	29.77
0.300	-6.621	7.441	1.70	0.0026	757.8	431.5	29.66
0.400	-6.596	7.083	3.39	0.0097	775.5	438.4	29.48
0.500	-6.573	6.705	5.61	0.0066	791.5	450.9	29.67
0.600	-6.556	6.299	8.21	0.0046	805.9	467.5	30.12
0.700	-6.525	5.855	11.53	-0.0041	814.4	491.9	31.13
0.800	-6.473	5.357	16.10	-0.0156	822.0	528.1	32.72
0.900	-6.441	4.746	22.53	-0.0463	815.1	564.4	34.70
0.950	-6.461	4.356	27.49	-0.0717	805.7	577.6	35.63
1.000	-6.526	3.824	34.87	-0.0668	795.8	588.7	36.49
SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL
1	0.877	16.567	21.609	607.9	60.84	1309.0	1.125
2	0.878	16.653	22.277	610.5	58.61	1279.5	1.101
3	0.878	16.713	22.884	612.7	56.47	1251.5	1.078
4	0.874	16.753	23.948	615.0	52.38	1204.3	1.042
5	0.867	16.678	24.420	613.1	49.32	1162.5	1.011
6	0.855	16.489	24.625	610.0	46.30	1122.5	0.981
7	0.837	16.179	24.678	607.6	42.78	1078.3	0.948
8	0.821	15.801	24.652	605.3	38.63	1031.7	0.911
9	0.803	15.425	24.601	603.4	33.61	977.9	0.868
10	0.786	14.942	24.521	601.9	26.92	921.8	0.822
11	0.753	14.273	23.897	597.5	18.53	859.7	0.772
12	0.745	13.778	23.170	592.7	13.34	828.1	0.747
13	0.696	13.028	22.035	584.9	6.18	800.5	0.728

STA= 14.500 MASS AVERAGED PROPERTIES
 PT= 24.006 TT= 606.38 GAMMA=1.4012 PT-RAT= 1.633 TT-RAT= 1.169
 RCU= 2981.3 VM= 772.6 C2= 753.6 MM=0.680 MABS=0.795 MREL=0.936

ROTATOR
 STA = 15.000 AFLOW = 144.25 D+C=0. D+H=0.
 WTF = 61.365 OPTX=TT OPTY=PT OPTZ=O INBR=3 ABC=O. ABH=O.
 PSIC Z R
 0. -6.538 8.500 0. 0. 0.0023 598.3 453.1 37.14 0.505
 0.050 -6.500 8.316 -0.08 -0.0023 627.8 465.1 36.53 0.531
 0.100 -6.466 8.138 -0.01 0.0110 653.3 475.3 36.04 0.554
 0.200 -6.412 7.791 0.55 0.0152 700.3 483.4 34.61 0.599
 0.300 -6.367 7.448 1.67 0.0008 726.7 492.8 34.14 0.625
 0.400 -6.328 7.098 3.40 -0.0115 745.4 501.7 33.94 0.645
 0.500 -6.295 6.732 5.65 -0.0117 760.3 514.3 34.08 0.661
 0.600 -6.265 6.341 8.32 -0.0177 772.0 533.7 34.66 0.674
 0.700 -6.225 5.916 11.78 -0.0248 779.7 559.3 35.65 0.685
 0.800 -6.168 5.446 16.48 -0.0265 791.2 591.0 37.04 0.699
 0.900 -6.139 4.874 23.48 -0.0559 801.2 644.0 38.79 0.714
 0.950 -6.166 4.513 28.67 -0.0516 806.6 671.3 39.77 0.724
 1.000 -6.243 4.026 36.12 -0.0570 810.9 710.2 41.21 0.735

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.881	18.155	23.777	631.9	60.25	1205.8	1.017	750.5	0.633
2	0.882	18.211	24.416	632.4	57.94	1182.8	1.000	781.4	0.661
3	0.883	18.214	24.943	632.4	55.78	1161.8	0.986	808.0	0.685
4	0.880	18.096	25.738	629.4	51.85	1133.7	0.969	850.9	0.727
5	0.874	17.919	26.154	626.6	48.51	1096.8	0.943	878.0	0.755
6	0.865	17.715	26.407	623.4	45.21	1058.1	0.915	898.6	0.777
7	0.851	17.401	26.477	620.5	41.55	1015.9	0.883	917.9	0.798
8	0.839	17.004	26.448	618.2	37.15	968.8	0.846	938.5	0.820
9	0.826	16.577	26.390	616.0	31.87	918.1	0.806	959.6	0.843
10	0.815	15.950	26.295	614.3	24.71	870.9	0.770	991.2	0.876
11	0.785	14.982	25.810	611.0	15.10	829.9	0.740	1027.9	0.916
12	0.790	14.247	25.244	607.8	8.82	816.2	0.733	1049.4	0.942
13	0.743	13.223	24.388	602.8	0.01	810.9	0.735	1078.0	0.977

STA = 15.000 MASS AVERAGED PROPERTIES
 PT = 25.878 TT = 620.97 GAMMA = 1.4010 PT-RAT = 1.761 TT-RAT = 1.197
 RCU = 3478.6 VM = 743.6 C2 = 723.5 MM = 0.648 MAB = 0.800 MREL = 0.873

STA= 15.500 STA= 15.500 STA= 15.500 STA= 15.500 STA= 15.500
 MTIP=196 MTIP=196 MTIP=196 MTIP=196 MTIP=196
 OPTY=PT OPTY=PT OPTY=PT OPTY=PT OPTY=PT
 OPTX=TT OPTX=TT OPTX=TT OPTX=TT OPTX=TT
 PHI PHI PHI PHI PHI
 CURV CURV CURV CURV CURV
 WM WM WM WM WM
 CU CU CU CU CU
 ALPHAM ALPHAM ALPHAM ALPHAM ALPHAM
 MM MM MM MM MM
 IN ROTOR IN ROTOR IN ROTOR IN ROTOR IN ROTOR
 D+C=O. D+C=O. D+C=O. D+C=O. D+C=O.
 D+H=O. D+H=O. D+H=O. D+H=O. D+H=O.
 ABH=O. ABH=O. ABH=O. ABH=O. ABH=O.
 R R R R R
 0. -6.334 8.500 0. 0. 562.1 526.5 43.13 0.468
 0.050 -6.286 8.315 -0.35 0.0467 592.8 530.8 41.84 0.495
 0.100 -6.244 8.137 -0.28 0.0308 620.2 532.8 40.67 0.521
 0.200 -6.173 7.793 0.47 -0.0036 667.9 537.5 38.83 0.565
 0.300 -6.114 7.456 1.85 -0.0244 696.0 544.4 38.04 0.593
 0.400 -6.061 7.115 3.74 -0.0331 713.0 554.2 37.86 0.611
 0.500 -6.014 6.761 6.08 -0.0415 723.7 567.6 38.11 0.623
 0.600 -5.974 6.385 8.89 -0.0494 729.4 588.2 38.89 0.631
 0.700 -5.925 5.980 12.40 -0.0454 735.4 614.3 39.87 0.639
 0.800 -5.864 5.538 17.09 -0.0400 748.3 651.7 41.06 0.655
 0.900 -5.838 5.008 24.35 -0.0358 778.7 704.3 42.13 0.689
 0.950 -5.871 4.678 29.59 -0.0437 797.0 740.1 42.88 0.711
 1.000 -5.960 4.235 36.53 0.0158 835.9 799.8 43.74 0.757

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	MABS
1	0.898	19.394	25.568	650.2	60.00	1124.1	0.935	770.2
2	0.899	19.378	26.071	648.4	57.67	1108.4	0.926	795.7
3	0.899	19.310	26.464	646.1	55.52	1095.6	0.920	817.6
4	0.898	19.159	27.205	641.8	51.43	1071.4	0.907	857.4
5	0.894	19.015	27.694	638.0	47.94	1038.8	0.885	883.6
6	0.889	18.842	27.994	634.6	44.53	1000.1	0.857	903.1
7	0.881	18.567	28.080	631.5	40.84	956.5	0.823	919.7
8	0.874	18.207	28.050	629.1	36.44	906.6	0.784	937.0
9	0.868	17.752	27.985	626.7	30.95	857.5	0.745	958.2
10	0.862	17.041	27.876	624.8	23.51	816.0	0.714	992.3
11	0.842	15.739	27.505	622.4	12.98	799.2	0.707	1050.0
12	0.847	14.803	27.101	620.5	6.12	801.5	0.715	1087.6
13	0.800	13.254	26.566	618.3	-3.59	837.5	0.759	1156.9

STA 15.500 MASS AVERAGED PROPERTIES
 PT= 27.493 TT= 632.94 GAMMA=1.4008 PT-RAT= 1.871 TT-RAT= 1.220
 RCU= 3886.8 VM= 710.7 CZ= 689.7 MM=0.613 MABS=0.801 MREL=0.818

ROTOR 1
 I=17
 OPTX=TT
 MTIP=209
 STA= 16.000
 MTIP=209
 SPTY=PT
 PHI CURV VM
 D+C=0.
 ABC=0.
 ABH=0.
 MM
 PSIC Z R
 0. -6.131 8.500 0. 0. 520.2 567.1 47.47 0.429
 0.050 -6.073 8.314 -.37 -0.0438 560.3 570.0 45.49 0.465
 0.100 -6.022 8.136 -0.C9 -0.0600 588.4 571.9 44.19 0.490
 0.200 -5.935 7.795 1.04 -0.0802 634.5 577.2 42.29 0.533
 0.300 -5.860 7.465 2.64 -0.0849 659.5 584.4 41.55 0.557
 0.400 -5.794 7.134 4.58 -0.0763 673.3 594.4 41.44 0.572
 0.500 -5.734 6.792 6.89 -0.0599 678.7 608.2 41.86 0.579
 0.600 -5.683 6.432 9.63 -0.0378 680.6 629.5 42.77 0.583
 0.700 -5.626 6.048 12.94 -0.0156 687.5 654.8 43.60 0.592
 0.800 -5.560 5.633 17.25 0.0221 700.7 690.4 44.58 0.608
 0.900 -5.537 5.145 23.80 0.0935 725.2 746.5 45.83 0.636
 0.950 -5.576 4.846 28.32 0.1745 757.6 792.0 46.27 0.670
 1.000 -5.677 4.442 35.49 0.0883 781.8 870.1 48.06 0.700

TE ROTOR
 STA= 16.000
 AFLOW= 148.35
 ITYPE=6 INBR=3
 CU ALPHAM MM
 SL BLDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.926 20.245 26.560 660.3 60.86 1068.1 0.882 769.6 0.635
 2 0.927 20.194 27.120 657.9 58.02 1057.7 0.877 799.2 0.663
 3 0.927 20.157 27.560 655.4 55.74 1045.2 0.871 820.6 0.684
 4 0.927 20.091 28.390 650.9 51.53 1019.8 0.857 857.8 0.720
 5 0.928 20.023 28.940 646.9 48.02 985.9 0.833 881.2 0.745
 6 0.928 19.910 29.280 643.3 44.63 946.0 0.804 898.1 0.763
 7 0.928 19.696 29.380 640.1 41.03 899.6 0.768 911.3 0.778
 8 0.928 19.355 29.350 637.7 36.61 847.8 0.727 927.0 0.795
 9 0.928 18.858 29.280 635.1 30.96 801.8 0.691 949.4 0.818
 10 0.928 18.112 29.160 633.0 23.43 763.6 0.663 983.7 0.853
 11 0.930 16.870 28.920 631.6 12.56 743.0 0.651 1040.7 0.912
 12 0.914 15.740 28.770 631.5 4.77 760.2 0.672 1095.9 0.969
 13 0.875 14.297 28.650 632.3 -6.30 786.6 0.704 1169.8 1.048

STA 16.000 MASS AVERAGED PROPERTIES
 PT= 28.783 TI= 642.01 GAMMA= 1.4006 PT-RAT= 1.959 TI-RAT= 1.238
 RCU= 4196.1 VM= 668.4 CZ= 649.0 MM= 0.572 MABS= 0.791 MREL= 0.765

AVERAGE BLADE SPEED ACC PT ACC TT AXIAL
 PCT IMM RAD IN OUT RATIO RATIO AD POLY VEL R
 0. 8.500 1500.0 1500.0 1.8073 0.675 0.701 0.625
 3.7 8.318 1468.6 1467.1 1.8454 0.713 0.737 0.671
 7.3 8.138 1436.4 1435.7 1.8753 1.2656 0.747 0.768 0.704
 14.6 7.779 1369.7 1375.6 1.9318 1.2549 0.812 0.829 0.760
 21.9 7.414 1299.2 1317.3 1.9692 1.2472 0.865 0.877 0.795
 29.6 7.035 1224.0 1258.9 1.9924 1.2402 0.907 0.915 0.823
 37.7 6.634 1142.7 1198.6 1.9992 1.2341 0.936 0.942 0.851
 46.4 6.200 1053.2 1135.1 1.9971 1.2294 0.953 0.957 0.889
 56.1 5.723 952.4 1067.3 1.9924 1.2244 0.971 0.973 0.952
 67.0 5.184 835.6 994.0 1.9842 1.2204 0.982 0.984 1.041
 80.3 4.525 689.0 908.0 1.9679 1.2177 0.981 0.983 1.183
 88.8 4.104 593.2 855.1 1.9577 1.2175 0.974 0.976 1.323
 100.0 3.547 468.2 783.8 1.9495 1.2190 0.960 0.964 1.346

FREE		STA= 17.000		AFLOW= 146.24		D+C=O.		FREE	
WTF=	61.365	OPTX=DPP	OPTY=FREE	ITYPE=O	INBR=O	ABC=O.	ABH=O.	D+H=O.	
PSI C	Z	R	PHI	CURV	VM	CU	ALPHAM	MM	
0.	-5.700	8.500	0.	0.	509.7	567.1	48.05	0.420	
0.050	-5.639	8.315	0.73	-0.0445	558.8	569.9	45.56	0.463	
0.100	-5.587	8.141	1.44	-0.0632	592.2	571.6	43.98	0.494	
0.200	-5.499	7.811	2.90	-0.0684	646.1	576.1	41.72	0.543	
0.300	-5.430	7.492	4.39	-0.0563	676.7	582.3	40.71	0.573	
0.400	-5.375	7.173	5.97	-0.0394	695.7	591.1	40.35	0.592	
0.500	-5.333	6.845	7.79	-0.0178	704.3	603.5	40.59	0.602	
0.600	-5.305	6.498	9.98	0.0054	707.3	623.1	41.38	0.608	
0.700	-5.294	6.125	12.76	0.0336	712.8	646.6	42.21	0.615	
0.800	-5.304	5.711	16.55	0.0685	717.0	680.9	43.52	0.623	
0.900	-5.351	5.225	22.40	0.1474	726.3	735.1	45.34	0.636	
0.950	-5.405	4.934	26.18	0.2132	742.3	777.8	46.34	0.654	
1.000	-5.521	4.550	33.90	0.2101	731.0	849.4	49.29	0.649	

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.940	20.329	26.533	660.3	61.35	1063.1	0.877	762.5	0.629
2	0.940	20.191	27.093	657.9	58.09	1057.2	0.877	798.1	0.662
3	0.940	20.097	27.532	655.4	55.60	1048.3	0.874	823.1	0.686
4	0.940	19.956	28.390	650.9	51.15	1030.1	0.866	865.7	0.728
5	0.940	19.818	28.940	646.9	47.55	1002.6	0.849	892.7	0.756
6	0.940	19.641	29.280	643.3	44.12	969.2	0.825	912.9	0.777
7	0.940	19.398	29.380	640.1	40.64	928.1	0.794	927.5	0.793
8	0.940	19.066	29.350	637.7	36.52	880.1	0.756	942.6	0.810
9	0.940	18.617	29.280	635.1	31.35	834.6	0.721	962.4	0.831
10	0.940	18.015	29.160	633.0	24.51	788.0	0.684	988.8	0.859
11	0.940	17.009	28.920	631.6	14.44	750.0	0.657	1033.4	0.905
12	0.940	16.132	28.770	631.5	7.13	748.1	0.659	1075.2	0.948
13	0.940	15.176	28.564	632.3	-3.64	732.5	0.650	1120.7	0.995

STA 17.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 642.01 GAMMA=1.4006 PT-RAT= 1.958 TT-RAT= 1.238
 RCU= 4196.1 VM= 681.0 CZ= 662.8 MM=0.583 MABS=0.796 MREL=0.779

STATOR		I=19	STA= 18 000	AFLOW= 141.59	D+C=0.	LE STATOR		
WTF=	61.365	OPTX=DPP	OPTY=FREE	ITYPE=1	INBR=4	D+H=0.		
PSIC	Z	R	PHI	CURV	VM	CU	ALPHAM	MM
0.	-5.250	E.500	0.	0.	548.9	367.1	45.94	0.454
0.050	-5.193	E.324	1.38	-0.0062	588.6	569.2	44.04	0.489
0.100	-5.143	E.157	2.40	-0.0120	618.1	570.4	42.70	0.516
0.200	-5.064	E.838	3.98	-0.0180	670.0	574.0	40.59	0.564
0.300	-5.004	E.529	5.30	-0.0181	702.0	579.4	39.54	0.596
0.400	-4.962	E.220	6.64	-0.0166	723.8	587.3	39.06	0.618
0.500	-4.938	E.901	8.16	-0.0143	735.7	598.6	39.14	0.631
0.600	-4.933	E.564	10.06	-0.0129	742.5	616.9	39.72	0.640
0.700	-4.952	E.200	12.53	-0.0104	751.2	638.7	40.37	0.651
0.800	-5.003	E.797	15.89	0.0055	759.4	670.8	41.45	0.662
0.900	-5.108	E.321	21.09	0.0278	765.2	721.9	43.33	0.672
0.950	-5.201	E.029	24.65	0.0252	754.3	763.0	45.33	0.665
1.000	-5.375	E.643	31.23	0.3271	800.3	832.3	46.12	0.715
SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	MABS
1	0	940	19.931	26.533	660.3	59.53	1082.4	0.895
2	0	940	19.867	27.093	657.9	56.81	1075.2	0.894
3	0	940	19.805	27.532	655.4	54.58	1066.5	0.891
4	0	940	19.671	28.390	650.9	50.38	1050.6	0.885
5	0	940	19.506	28.940	646.9	46.86	1026.8	0.871
6	0	940	19.291	29.280	643.3	43.50	997.7	0.852
7	0	940	19.011	29.380	640.1	40.08	961.5	0.825
8	0	940	18.644	29.350	637.7	36.10	918.9	0.792
9	0	940	18.172	29.280	635.1	31.23	878.6	0.761
10	0	940	17.554	29.160	633.0	24.89	827.2	0.730
11	0	940	16.658	28.920	631.6	15.84	795.4	0.698
12	0	940	16.175	28.770	631.5	9.37	764.5	0.674
13	0	940	14.539	28.564	632.3	-0.92	800.4	0.715
STA= 18.000 MASS AVERAGED PROPERTIES								
P1= 28.777	TT= 642.01	GAMMA=1.4007	PT-RAT= 1.958	TT-RAT= 1.238				
RCU= 4.96.1	VM= 713.1	CZ= 695.3	MM=0.612	MABS=0.815	MREL=0.809			

STATOR		I=20	STA= 19.000	AFLOW= 126.03	D+C=0.
WTF =	61.365	OPTX=DPP	MTIP=248	INBR=4	D+H=0.
PSIC	Z	R	OPTY=BETM	ITYPE=2	ABC=0.
0.	-4.770	8.500	PHI	CURV	ALPHAM
0.	-4.724	8.335	0.	0.	MM
0.050	-4.683	8.177	1.06	0.0296	614.0
0.100	-4.641	7.870	1.94	0.0468	375.1
0.200	-4.567	7.570	3.43	0.0607	384.2
0.300	-4.532	7.270	4.78	0.0593	643.2
0.400	-4.512	6.962	6.19	0.0531	666.7
0.500	-4.508	6.639	7.79	0.0444	779.2
0.600	-4.524	6.295	9.73	0.0396	791.1
0.700	-4.696	5.253	12.13	0.0420	806.1
0.800	-4.661	5.495	15.19	0.0480	742.5
0.900	-4.641	5.495	19.46	0.0863	765.0
0.950	-4.696	5.253	22.42	0.1156	426.4
1.000	-4.770	4.975	26.23	0.1265	779.2
					435.8
					447.6
					29.50
					29.69
					0.595
					0.625
					0.648
					0.663
					0.676
					0.693
					0.715
					0.747
					0.774
					0.807
SL	BLDBLK	PS	PT	TT	VREL
1	0.875	20.954	26.533	660.3	61.37
2	0.877	20.937	27.093	657.9	59.38
3	0.878	20.891	27.532	655.4	57.64
4	0.879	20.744	28.390	650.9	54.11
5	0.880	20.546	28.940	646.9	51.08
6	0.881	20.310	29.280	643.3	48.23
7	0.880	20.034	29.380	640.1	45.50
8	0.880	19.688	29.350	637.7	42.47
9	0.878	19.196	29.280	635.1	38.65
10	0.875	18.487	29.160	633.0	33.61
11	0.867	17.432	28.920	631.6	26.83
12	0.857	16.666	28.770	631.5	22.37
13	0.837	15.674	28.564	632.3	16.80

PT = 28.777 TT = 642.01 GAMMA = 1.4005 PT-RAT = 1.958 TT-RAT = 1.238
RCU = 3055.6 VM = 770.9 MM = 0.657 MABS = 0.761 MREL = 0.941

STATOR		I=21	STA= 20.000	AFLOW= 118.87	IN STATOR	
WTF =	61.365	OPTX=DPP	OPTY=BETM	I TYPE=2	INBR=4	D+C=0.
PSIC	Z	R	PHI	CURV	VM	ABC=0.
0.	-4.300	8.500	C	O	652.8	261.4
0.050	-4.277	8.341	0.63	0.0044	682.7	270.9
0.100	-4.258	8.188	1.26	0.0088	705.1	277.6
0.200	-4.225	7.889	2.57	0.0163	746.2	290.0
0.300	-4.201	7.597	3.93	0.0217	772.7	297.1
0.400	-4.184	7.305	5.39	0.0263	791.1	302.1
0.500	-4.174	7.006	7.03	0.0332	801.7	305.5
0.600	-4.173	6.695	8.93	0.0431	810.7	310.0
0.700	-4.180	6.367	11.15	0.0554	822.6	318.2
0.800	-4.199	6.016	13.86	0.0750	840.5	332.6
0.900	-4.233	5.631	17.33	0.0867	865.1	353.1
0.950	-4.261	5.420	19.55	0.0993	882.1	365.7
1.000	-4.300	5.188	22.50	0.1259	903.6	381.9

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.849	21.184	26.533	660.3	62.21	1400.1	1.148	703.2	0.577
2	0.851	21.156	27.093	657.9	60.39	1381.6	1.138	734.5	0.605
3	0.852	21.124	27.532	655.4	58.87	1363.7	1.129	757.7	0.627
4	0.855	21.048	28.390	650.9	55.90	1331.1	1.111	800.5	0.668
5	0.857	20.950	28.940	646.9	53.48	1298.5	1.091	827.9	0.695
6	0.859	20.824	29.280	643.3	51.28	1264.9	1.068	846.9	0.715
7	0.860	20.660	29.380	640.1	49.26	1228.5	1.041	858.0	0.727
8	0.860	20.432	29.350	637.7	47.07	1190.2	1.012	867.9	0.738
9	0.858	20.098	29.280	635.1	44.39	1151.2	0.983	882.0	0.753
10	0.855	19.590	29.160	633.0	40.94	1112.6	0.955	903.9	0.776
11	0.847	18.855	28.920	631.6	36.52	1076.5	0.929	934.4	0.806
12	0.840	18.379	28.770	631.5	33.81	1061.6	0.918	954.9	0.826
13	0.828	17.781	28.564	632.3	30.56	1049.4	0.911	981.0	0.851

STA 20.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 642.01 GAMMA= 1.4004 PT-RAT= 1.958 TI-RAT= 1.238
 RCU= 2135.2 VM= 793.5 CZ= 780.0 MM= 0.672 MABS= 0.722 MREL= 1.035

STA= 21.000 AFLOW= 115.15 D+C=0.
 MTIP=274 OPTY=BETM ITYPE=2 INBR=4 ABC=0.
 D+H=0.
 ABH=0.
 MM
 IN STATOR

STATOR	I=22	OPTX=DPP	OPTY=BETM	ITYPE=2	INBR=4	ABC=0.	D+H=0.	ABH=0.	MM
WTF	61.365	Z	R	PHI	CURV	VM	CL	ALPHAM	
PSIC	-3.800	8.500	O.	O.	669.0	169.3	14.20	0.548	
0.	-3.800	8.500	O.	O.	669.0	174.8	14.02	0.576	
0.050	-3.800	8.346	O.	0.53	0.0027	700.2	178.4	13.86	0.598
0.100	-3.800	8.197	O.	0.09	0.0046	723.2	185.0	13.59	0.638
0.200	-3.800	7.907	O.	2.25	0.0093	765.1	188.7	13.41	0.664
0.300	-3.800	7.623	O.	3.50	0.0157	791.3	191.1	13.29	0.682
0.400	-3.800	7.339	O.	4.84	0.0235	809.2	192.2	13.21	0.693
0.500	-3.800	7.049	O.	6.32	0.0328	819.0	193.2	13.16	0.701
0.600	-3.800	6.750	O.	7.99	0.0438	826.7	196.2	13.20	0.712
0.700	-3.800	6.437	O.	9.91	0.0564	836.0	202.7	13.44	0.725
0.800	-3.800	6.108	O.	12.15	0.0711	848.2	212.2	13.79	0.741
0.900	-3.800	5.757	O.	14.95	0.0978	864.3	216.9	13.90	0.753
0.950	-3.800	5.571	O.	16.62	0.1115	876.7	221.8	13.98	0.766
1.000	-3.800	5.376	O.	18.63	0.1266	891.1			

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.849	21.367	26.533	660.3	63.31	1489.4	1.220	690.1	0.565
2	0.850	21.344	27.093	657.9	61.66	1474.8	1.214	721.7	0.594
3	0.851	21.320	27.532	655.4	60.30	1459.8	1.207	-44.9	0.616
4	0.853	21.267	28.390	650.9	57.70	1431.9	1.193	787.2	0.656
5	0.855	21.195	28.940	646.9	55.62	1401.3	1.175	813.5	0.682
6	0.856	21.094	29.280	643.3	53.76	1368.8	1.154	831.4	0.701
7	0.858	20.957	29.380	640.1	52.09	1333.1	1.128	841.2	0.712
8	0.858	20.771	29.350	637.7	50.36	1295.9	1.100	849.0	0.720
9	0.859	20.516	29.280	635.1	48.35	1257.9	1.071	858.8	0.731
10	0.858	20.168	29.160	633.0	45.90	1218.7	1.041	872.1	0.745
11	0.855	19.664	28.920	631.6	42.92	1180.2	1.012	889.9	
12	0.854	19.323	28.770	631.5	41.15	1164.3	1.000	903.1	0.776
13	0.852	18.924	28.564	632.3	39.20	1149.9	0.989	918.2	0.790

STA 21.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 642.01 GAMMA= 1.4003 PT-RAT= 1.958 TT-RAT= 1.238
 RCU= 1346.9 VM= 806.5 C2= 796.3 MM= 0.681 MABS= 0.700 MREL= 1.118

STATOR		I=23	AFLOW=	114.72	D+C=0.		
WTF=	61.365	OPTX=DPP	OPTY=BETM	INBR=4	D+H=0.		
PSIC	Z	R	PHI	CURV	CU	ALPHAM	MM
0.	-3.204	8.500	0.	0.	660.0	83.3	7.19
0.050	-3.211	8.351	0.54	-0.0033	692.0	85.9	7.08
0.100	-3.218	8.207	1.04	-0.0019	715.1	87.5	6.97
0.200	-3.232	7.928	2.00	0.0063	757.4	90.2	6.79
0.300	-3.245	7.655	3.01	0.0151	784.0	91.6	6.66
0.400	-3.259	7.381	4.10	0.0239	802.1	92.2	6.56
0.500	-3.272	7.103	5.33	0.0324	812.0	92.3	6.48
0.600	-3.286	6.816	6.71	0.0423	819.2	92.3	6.43
0.700	-3.301	6.517	8.31	0.0543	827.8	93.2	6.43
0.800	-3.316	6.204	10.33	0.0574	837.6	95.5	6.51
0.900	-3.333	5.871	12.72	0.0640	845.3	98.6	6.65
0.350	-3.341	5.695	13.98	0.0823	850.9	100.2	6.72
1.000	-3.350	5.512	15.23	0.1249	860.5	102.2	6.77
							0.735
SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL
1	0.880	21.706	26.533	660.3	65.02	1563.0	1.277
2	0.880	21.696	27.093	657.9	63.50	1550.8	1.273
3	0.881	21.689	27.532	655.4	62.28	1537.3	1.268
4	0.882	21.660	28.390	650.9	59.94	1512.1	1.257
5	0.883	21.602	28.940	646.9	58.09	1483.4	1.240
6	0.883	21.510	29.280	643.3	56.47	1452.0	1.220
7	0.884	21.379	29.380	640.1	55.04	1417.0	1.195
8	0.885	21.204	29.350	637.7	53.58	1380.0	1.168
9	0.886	20.972	29.280	635.1	51.93	1342.5	1.140
10	0.886	20.685	29.160	633.0	50.03	1303.9	1.110
11	0.886	20.357	28.920	631.6	47.96	1262.3	1.077
12	0.887	20.151	28.770	631.5	46.76	1242.1	1.061
13	0.887	19.843	28.564	632.3	45.33	1224.1	1.046

STA 22.000 MASS AVERAGED PROPERTIES

PT= 28.777 TT= 642.01 GAMMA= 1.4002 PT-RAT= 1.958 TT-RAT= 1.238
RCU= 651.6 WM= 796.2 CZ= 789.1 MM= 0.670 MABS= 0.675 MREL= 1.184

STATOR				STA= 23.000				TE STATOR			
WTF =	61.365	I=24	OPTX=DPP	MTP=300	AFLOW=	118.17	D=C=O.	D+H=O.		ABC=O.	ABH=O.
PSIC	Z	R	PHI	OPTY=BETM	ITYPE=3	INBR=4	MM	MM	CU	ALPHAM	
0.	-2.567	8.500	O.	O.	O.	654.7	O.	O.	0.535		
0.050	-2.581	8.358	0.49	0.0062	682.0	O.	O.	O.	0.559		
0.100	-2.595	8.218	0.91	0.0090	699.8	O.	O.	O.	0.576		
0.200	-2.622	7.948	1.68	0.0122	742.0	O.	O.	O.	0.615		
0.300	-2.648	7.683	2.44	0.0180	767.8	O.	O.	O.	0.641		
0.400	-2.674	7.419	3.26	0.0263	786.0	O.	O.	O.	0.659		
0.500	-2.700	7.151	4.18	0.0374	795.7	O.	O.	O.	0.670		
0.600	-2.727	6.875	5.22	0.0500	801.6	O.	O.	O.	0.676		
0.700	-2.756	6.588	6.43	0.0650	810.1	O.	O.	O.	0.686		
0.800	-2.785	6.291	8.01	0.0934	829.7	O.	O.	O.	0.705		
0.900	-2.816	5.977	9.87	0.1247	829.5	O.	O.	O.	0.706		
0.950	-2.833	5.809	10.79	0.1318	829.5	O.	O.	O.	0.706		
1.000	-2.850	5.631	11.52	0.1267	817.6	O.	O.	O.	0.694		
SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS		
1	0.940	21.498	26.109	660.3	66.42	1636.7	1.336	654.7	0.535		
2	0.940	21.499	26.581	657.9	65.18	1624.9	1.332	682.0	0.559		
3	0.940	21.495	26.910	655.4	64.24	1610.3	1.325	699.8	0.576		
4	0.940	21.479	27.731	650.9	62.12	1586.7	1.316	742.0	0.615		
5	0.940	21.449	28.269	646.9	60.48	1558.2	1.300	767.8	0.641		
6	0.940	21.396	28.639	643.3	59.02	1527.1	1.280	786.0	0.659		
7	0.940	21.307	28.780	640.1	57.77	1491.9	1.256	795.7	0.670		
8	0.940	21.173	28.769	637.7	56.55	1454.2	1.227	801.6	0.676		
9	0.940	20.986	28.749	635.1	55.13	1417.0	1.200	810.1	0.686		
10	0.940	20.699	28.851	633.0	53.23	1386.0	1.178	829.7	0.705		
11	0.940	20.256	28.251	631.6	51.81	1341.8	1.142	829.5	0.706		
12	0.940	19.975	27.860	631.5	51.02	1318.7	1.122	829.5	0.706		
13	0.940	19.674	27.159	632.3	50.55	1286.9	1.093	817.6	0.694		
STA= 23.000				MASS AVERAGED PROPERTIES							
PT =	28.163	TT =	642.01	GAMMA =	1.4001	PT-RAT =	1.916	TT-RAT =	1.238		
RCU =	O.	VM =	780.4	CZ =	776.2	MM =	O.655	MABS =	O.655	MREL =	1.244
AVERAGE	BLADE	SPEED	ACC	PT	ACC	TT	EFFICIENCY	AXIAL			
PCT	IMM	RAD	IN	OUT	RATIO	AD.	POLY	VEL R			
0.	8	500			1.7766	1.2730	0.654	0.681	1.193		
4.7	8.341				1.8088	1.2684	0.688	0.713	1.159		
9.3	8.188				1.8311	1.2636	0.716	0.739	1.133		
18.1	7.893				1.8870	1.2549	0.781	0.799	1.110		
26.6	7.606				1.9236	1.2472	0.832	0.847	1.097		
35.1	7.319				1.9487	1.2402	0.875	0.886	1.092		
43.8	7.026				1.9584	1.2341	0.905	0.914	1.090		
53.0	6.719				1.9576	1.2294	0.923	0.930	1.092		
62.6	6.394				1.9563	1.2244	0.942	0.948	1.098		
73.0	6.044				1.9632	1.2204	0.965	0.968	1.125		
84.8	5.649				1.9223	1.2177	0.944	0.949	1.145		
91.6	5.419				1.8958	1.2175	0.923	0.929	1.189		
100.0	5.137				1.8480	1.2190	0.876	0.887	1.171		

STA= 24.000 MTF= 61.365 OPTX=DPP OPTY=FREE AFLOW= 116.57 D+C=0. FREE
 MTF= 313 ITYPE=0 INBR=0 ABC=0. D+H=0.
 PSIC Z R PHI CURV VM CU ALPHAM MM
 0. -2.000 8.500 0. 0. 672.1 0. 0.550
 0.050 -2.000 8.362 0.32 0.0039 698.9 0. 0.574
 0.100 -2.000 8.226 0.63 0.0079 716.4 0. 0.590
 0.200 -2.000 7.963 1.18 0.0158 758.5 0. 0.630
 0.300 -2.000 7.707 1.68 0.0232 785.3 0. 0.656
 0.400 -2.000 7.451 2.15 0.0311 804.9 0. 0.676
 0.500 -2.000 7.193 2.63 0.0400 816.0 0. 0.688
 0.600 -2.000 6.928 3.12 0.0507 823.3 0. 0.696
 0.700 -2.000 6.655 3.62 0.0642 833.2 0. 0.707
 0.800 -2.000 6.373 4.11 0.0791 852.4 0. 0.727
 0.900 -2.000 6.078 4.59 0.0996 849.0 0. 0.724
 0.950 -2.000 5.921 4.85 0.1150 846.8 0. 0.722
 1.000 -2.000 5.757 5.28 0.1260 833.6 0. 0.709

SL BLDLWK PS PT TT BETAM VREL MREL VABS MABS
 1 0.950 21.267 26.109 660.3 65.86 1643.7 1.344 672.1 0.550
 2 0.950 21.264 26.581 657.9 64.66 1632.7 1.341 698.9 0.574
 3 0.950 21.256 26.910 655.4 63.73 1618.9 1.334 716.4 0.590
 4 0.950 21.224 27.731 650.9 61.64 1596.9 1.327 758.5 0.630
 5 0.950 21.166 28.269 646.9 60.00 1570.5 1.313 785.3 0.656
 6 0.950 21.081 28.639 643.3 58.53 1541.7 1.295 804.9 0.676
 7 0.950 20.963 28.780 640.1 57.26 1509.0 1.273 816.0 0.688
 8 0.950 20.803 28.769 637.7 56.04 1474.0 1.247 823.3 0.696
 9 0.950 20.589 28.749 635.1 54.64 1439.9 1.222 833.2 0.707
 10 0.950 20.302 28.851 633.0 52.84 1411.2 1.203 852.4 0.727
 11 0.950 19.921 28.251 631.6 51.63 1367.9 1.167 849.0 0.724
 12 0.950 19.683 27.860 631.5 50.98 1345.0 1.147 846.8 0.722
 13 0.950 19.413 27.159 632.3 50.63 1314.2 1.118 833.6 0.709

STA 24.000 MASS AVERAGED PROPERTIES

PT= 28.163 TT= 642.01 GAMMA= 1.4002 PT-RAT= 1.916 TT-RAT= 1.238
 RCU= O. VM= 799.7 CZ= 798.6 MM= 0.673 MABS= 0.673 MREL= 1.261

EXIT		STA = 25.000		AFLOW = 116.27		D+C=0.		FREE	
WTF	61.365	I=26	MTIP=326	OPTY=FREE	ITYPE=O	INBR=O	ABC=O.	D+H=O.	
PSIC	Z	OPTX=DPP	R	PHI	CURV	VM	CU	ABH=O.	
0.	-1.270	8.500	0.	0.	689.3	0.	0.	0.564	
0.050	-1.270	8.365	0.19	0.0025	715.2	0.	0.	0.588	
0.100	-1.270	8.232	0.36	0.0048	732.0	0.	0.	0.604	
0.200	-1.270	7.974	0.66	0.0092	772.3	0.	0.	0.643	
0.300	-1.270	7.722	0.91	0.0135	797.1	0.	0.	0.667	
0.400	-1.270	7.471	1.13	0.0180	814.4	0.	0.	0.685	
0.500	-1.270	7.217	1.32	0.0228	822.6	0.	0.	0.694	
0.600	-1.270	6.955	1.47	0.0279	825.9	0.	0.	0.699	
0.700	-1.270	6.685	1.58	0.0335	830.2	0.	0.	0.704	
0.800	-1.270	6.406	1.62	0.0398	841.6	0.	0.	0.716	
0.900	-1.270	6.112	1.54	0.0463	826.5	0.	0.	0.703	
0.950	-1.270	5.956	1.41	0.0493	816.1	0.	0.	0.693	
1.000	-1.270	5.790	0.00	0.1263	796.4	0.	0.	0.675	

SL	BLDBLK	PS	PT	TT	BETAM	VREL	MREL	MABS
1	0.956	21.036	26.109	660.3	65.32	1650.8	1.352	689.3
2	0.956	21.034	26.581	657.9	64.15	1640.3	1.349	715.2
3	0.956	21.028	26.910	655.4	63.26	1626.8	1.343	732.0
4	0.956	21.008	27.731	650.9	61.24	1605.3	1.335	772.3
5	0.956	20.973	28.269	646.9	59.68	1578.8	1.321	797.1
6	0.956	20.922	28.639	643.3	58.30	1549.7	1.303	814.4
7	0.956	20.851	28.780	640.1	57.14	1516.1	1.280	822.6
8	0.956	20.758	28.769	637.7	56.06	1479.4	1.252	825.9
9	0.956	20.640	28.749	635.1	54.86	1442.6	1.224	830.2
10	0.956	20.491	28.851	633.0	53.33	1409.4	1.200	841.6
11	0.956	20.307	28.251	631.6	52.54	1358.9	1.156	826.5
12	0.956	20.200	27.860	631.5	52.17	1330.6	1.131	816.1
13	0.956	20.016	27.159	632.3	52.07	1295.5	1.098	796.4

PT = 28.163 TT = 642.01 GAMMA = 1.4002 PT-RAT = 1.916 TT-RAT = 1.238
RCUx = 0. VM = 801.0 CZ = 800.8 MM = 0.674 MABS = 0.674 MREL = 1.264

STA 25.000 MASS AVERAGED PROPERTIES

EXIT	WTF=	I=27	STA= 26.000	AFLOW= 116.28	D+C=0.
	WTIP=	OPTX=DPP	OPTY=FREE	ITYPE=O	INBR=O
PSIC	Z	R	PHI	CURV	VM
SL	BLDBLK	PS	PT	TT	SETAM
1	0.956	20.792	26.109	660.3	64.76
2	0.956	20.791	26.581	657.9	63.63
3	0.956	20.791	26.910	655.4	62.77
4	0.956	20.791	27.731	650.9	60.84
5	0.956	20.791	28.269	646.9	59.36
6	0.956	20.791	28.639	643.3	58.10
7	0.956	20.791	28.780	640.1	57.08
8	0.956	20.791	28.769	637.7	56.18
9	0.956	20.791	28.749	635.1	55.20
10	0.956	20.790	28.851	633.0	53.95
11	0.956	20.789	28.251	631.6	53.55
12	0.956	20.789	27.860	631.5	53.43
13	0.956	20.789	27.159	632.3	53.82

SL	BLDBLK	PS	PT	TT	VREL	MREL	VABS	MABS
1	0.956	20.792	26.109	660.3	64.76	1658.3	1.360	707.0
2	0.956	20.791	26.581	657.9	63.63	1648.0	1.358	732.1
3	0.956	20.791	26.910	655.4	62.77	1634.7	1.352	748.1
4	0.956	20.791	27.731	650.9	60.84	1613.0	1.344	786.1
5	0.956	20.791	28.269	646.9	59.36	1585.9	1.329	808.2
6	0.956	20.791	28.639	643.3	58.10	1555.5	1.309	822.1
7	0.956	20.791	28.780	640.1	57.08	1519.9	1.284	826.0
8	0.956	20.791	28.769	637.7	56.18	1480.4	1.252	824.0
9	0.956	20.791	28.749	635.1	55.20	1439.6	1.220	821.5
10	0.956	20.790	28.851	633.0	53.95	1400.9	1.190	824.4
11	0.956	20.789	28.251	631.6	53.55	1342.8	1.139	797.9
12	0.956	20.789	27.860	631.5	53.43	1309.7	1.108	780.3
13	0.956	20.789	27.159	632.3	53.82	1266.0	1.067	747.3

STA 26.000 MASS AVERAGED PROPERTIES
 PT = 28.163 TT = 642.01 GAMMA = 1.4002 PT-RAT = 1.916 TT-RAT = 1.238
 RCU = O. VM = 799.2 CZ = 799.1 MM = 0.672 MABS = 0.672 MREL = 1.264

PHASE V ROTOR
BLADE FORCES

THE FORCE CALCULATIONS ARE 'PER BLADE ROW'.
TO FIND THE FORCE ON A SINGLE BLADE, DIVIDE BY 'NB'.

THE FORCES ARE THAT OF THE AIR ON THE BLADES.
POSITIVE AXIAL IS AFT; POSITIVE TANGENTIAL IS IN ROTATION DIRECTION.
THE COLUMNS HEADED BY F-TAN*, F-AXL*, AND F-RAD* ARE THE TANGENTIAL,
AXIAL, AND RADIAL FORCES PER INCH OF CHANGE IN R-AVG.

SL	R-AVG (IN.)	H-AVG (IN.)	F-TAN* (LB/IN)	F-AXL* (LB/IN)	F-RAD* (LB/IN)
1	8.500	Ø. 182	-296.2	-397.9	-10.8
2	8.318	Ø. 182	-299.7	-399.4	-11.3
3	8.138	Ø. 362	-304.2	-400.2	-11.3
4	7.779	Ø. 721	-305.8	-394.8	-9.8
5	7.414	1. Ø86	-303.Ø	-382.8	-8.5
6	7.435	1. 465	-295.9	-362.2	-12.7
7	6.634	1. 866	-286.9	-332.5	-13.8
8	6.292	2. 300	-274.4	-297.3	-8.3
9	5.723	2. 777	-262.5	-257.6	-16.Ø
10	5.184	3. 316	-245.1	-207.8	-23.4
11	4.525	3. 975	-214.2	-136.7	-25.5
12	4.134	4. 396	-186.8	-82.9	-29.9
13	3.547	4. 953	-165.3	-44.6	-31.5

NET TORQUE = -8000.6 IN-LB
NET TAN. FORCE = -1279.2 LB
NET AXIAL FORCE = -1298.Ø LB
NET RADIAL FORCE = -86.4 LB

2. STREAMSURFACE BLADE COORDINATES

Figure 78 shows the stacked Phase V rotor streamsurface sections. Each page of the following tabulation gives the coordinates for one of these sections. The streamline designation for these sections corresponds to the calculation streamlines of the circumferential average flow calculation. Streamline 1 is at the casing and streamline 13 is at the hub. Also given in the tabulations are coordinates for the section meanline, the meanline angle, and the section thickness at each point. Streamsurface section chord, camber angle, and stagger angle are also given. All dimensions in this tabulation are in inches or degrees.

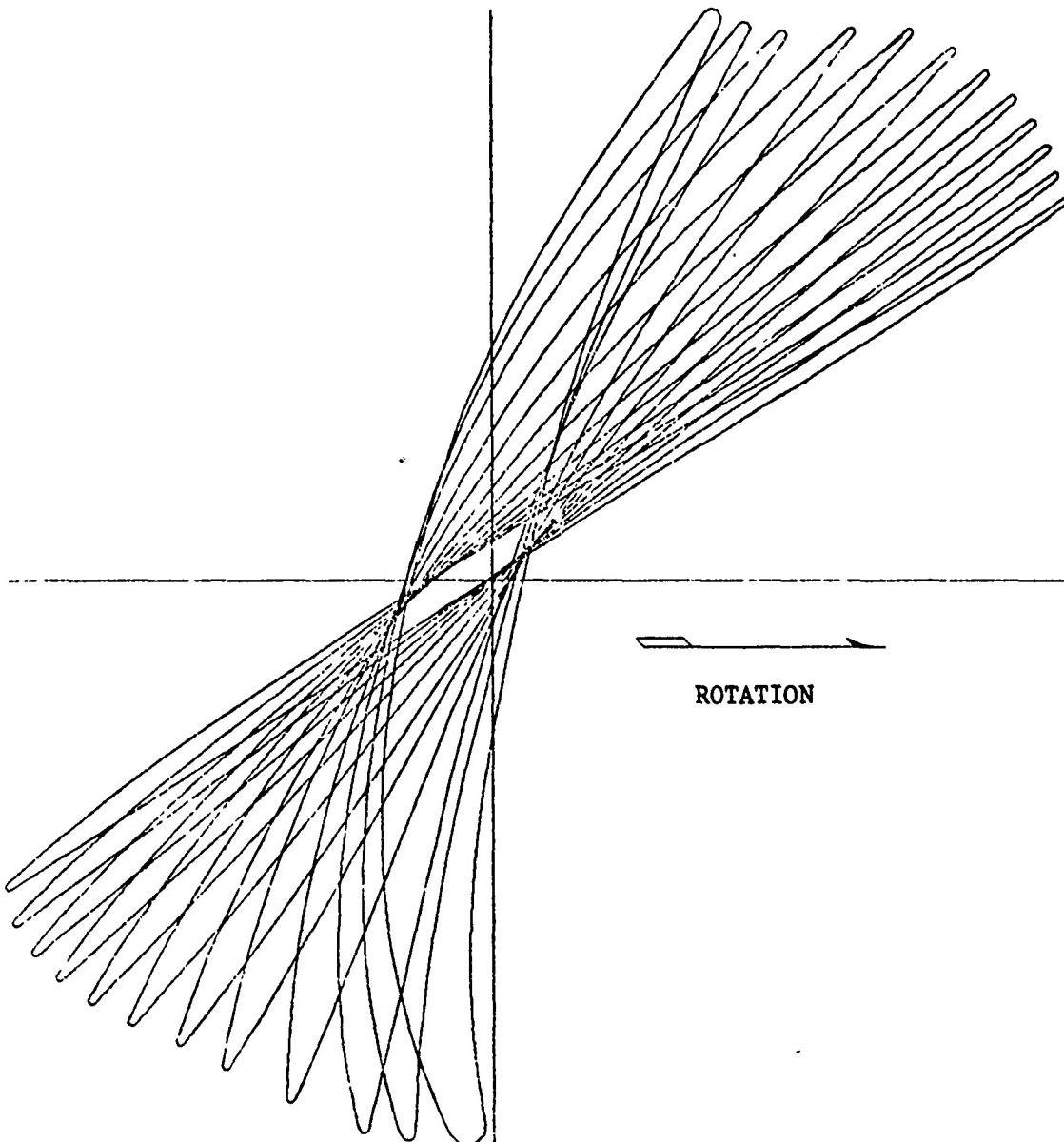


Figure 78. Stacked Phase V Rotor Streamsurface Sections

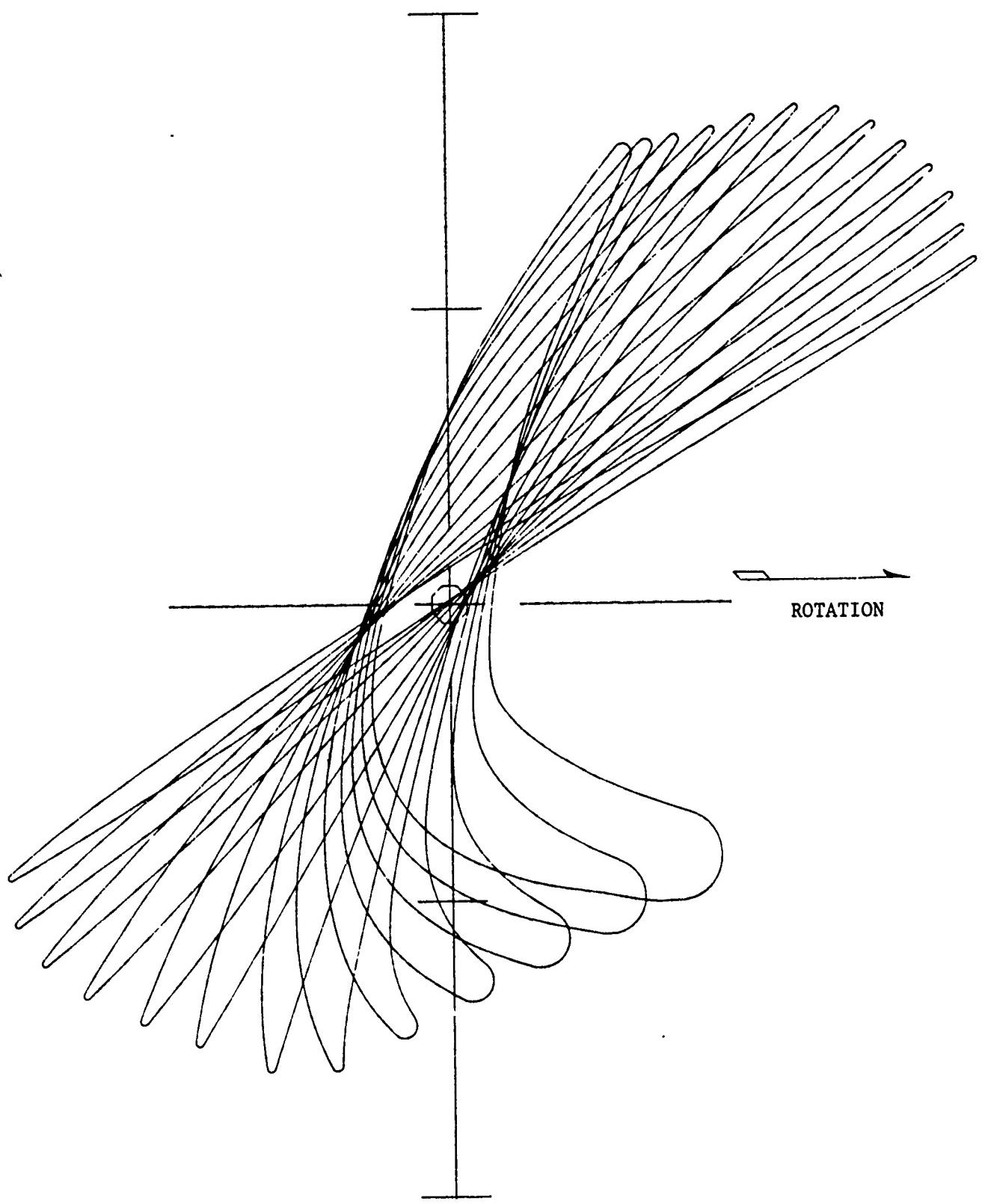


Figure 79. Stacked Phase V Rotor Plane Sections

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 1							
	R	Z	THETA	B*	T(Z)	PHI	T(M)
PT 1	-1.12850	8.50000	0.21035	-55.160	0.01882	0.	-1.12850
2	-1.07760	8.50000	0.20163	-55.923	0.02265	0.	-1.07760
3	-0.97580	8.50000	0.18344	-57.311	0.03051	0.	-0.97580
4	-0.87410	8.50000	0.16435	-58.457	0.03854	0.	-0.87410
5	-0.77230	8.50000	0.14447	-59.373	0.04658	0.	-0.77230
6	-0.66030	8.50000	0.12184	-60.185	0.05530	0.	-0.66030
7	-0.53820	8.50000	0.09646	-60.691	0.06443	0.	-0.53820
8	-0.41610	8.50000	0.07090	-60.518	0.07279	0.	-0.41610
9	-0.29390	8.50000	0.04578	-59.899	0.08006	0.	-0.29390
10	-0.17180	8.50000	0.02134	-59.226	0.08608	0.	-0.17180
11	-0.04970	8.50000	-0.00255	-58.760	0.09078	0.	-0.04970
12	0.07240	8.50000	-0.02612	-58.547	0.09408	0.	0.07240
13	0.19460	8.50000	-0.04955	-58.416	0.09587	0.	0.19460
14	0.31670	8.50000	-0.07283	-58.194	0.09601	0.	0.31670
15	0.43880	8.50000	-0.09582	-57.757	0.09333	0.	0.43880
16	0.56100	8.50000	-0.11833	-57.092	0.08547	0.	0.56100
17	0.68310	8.50000	-0.14015	-56.106	0.07035	0.	0.68310
18	0.80520	8.50000	-0.16099	-54.635	0.04644	0.	0.80520
19	0.90700	8.50000	-0.17740	-53.100	0.01923	0.	0.90700

MEANLINE INPUT DATA - STREAMLINE 3							
	R	Z	THETA	B*	T(Z)	PHI	T(M)
PT 1	-1.20460	8.13970	0.21627	-53.773	0.01945	0.752	-1.20464
2	-1.14910	8.14050	0.20684	-54.485	0.02362	0.731	-1.14914
3	-1.03810	8.14190	0.18726	-55.791	0.03213	0.657	-1.03813
4	-0.92710	8.14310	0.16677	-56.879	0.04078	0.484	-0.92712
5	-0.81610	8.14380	0.14553	-57.717	0.04942	0.241	-0.81612
6	-0.69410	8.14410	0.12148	-58.342	0.05870	0.027	-0.69412
7	-0.56090	8.14380	0.09479	-58.573	0.06827	-0.122	-0.56092
8	-0.42270	8.14340	0.06817	-58.196	0.07690	-0.283	-0.42272
9	-0.29450	8.14270	0.04217	-57.394	0.08431	-0.465	-0.29452
10	-0.16130	8.14120	0.01704	-56.485	0.09032	-0.610	-0.16131
11	-0.02810	8.13970	-0.00731	-55.764	0.09488	-0.588	-0.02810
12	0.10510	8.13850	-0.03114	-55.337	0.09791	-0.409	0.10510
13	0.23830	8.13780	-0.05470	-55.083	0.09935	-0.211	0.23831
14	0.37150	8.13750	-0.07804	-54.814	0.09897	-0.055	0.37151
15	0.50470	8.13760	-0.10108	-54.373	0.09539	0.015	0.50471
16	0.63790	8.13760	-0.12366	-53.734	0.08657	0.091	0.63791
17	0.77110	8.13720	-0.14561	-52.744	0.07076	-0.265	0.77111
18	0.90430	8.13650	-0.16656	-51.124	0.04671	-0.238	0.90431
19	1.01530	8.13580	-0.18298	-49.372	0.01997	-0.092	1.01531

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 4

PT	Z	R	THETA	B*	T(Z)	PHI	X	B.M.	T(M)
1	-1.28430	7.76190	0.22309	-52.490	0.02005	1.729	-1.28457	-52.477	0.02006
2	-1.22460	7.76370	0.21294	-53.212	0.02489	1.717	-1.22485	-53.200	0.02490
3	-1.10520	7.76730	0.19189	-54.469	0.03474	1.676	-1.10539	-54.457	0.03475
4	-0.98590	7.77080	0.17003	-55.318	0.04470	1.583	-0.98605	-55.308	0.04471
5	-0.86650	7.77390	0.14759	-55.785	0.05453	1.439	-0.86660	-55.777	0.05454
6	-0.73520	7.77710	0.12261	-56.082	0.06495	1.262	-0.73527	-56.075	0.06496
7	-0.59200	7.78000	0.09516	-56.159	0.07558	1.059	-0.59204	-56.154	0.07559
8	-0.44880	7.78240	0.06785	-55.784	0.08513	0.827	-0.44882	-55.781	0.08514
9	-0.30550	7.78410	0.04119	-54.913	0.09328	0.579	-0.30551	-54.912	0.09328
10	-0.16230	7.78520	0.01556	-53.704	0.09982	0.357	-0.16230	-53.704	0.09982
11	-0.01910	7.78590	-0.00900	-52.704	0.10467	0.248	-0.01910	-52.703	0.10467
12	0.12410	7.78640	-0.03287	-52.121	0.10780	0.284	0.12410	-52.121	0.10780
13	0.26740	7.78730	-0.05633	-51.695	0.10913	0.423	0.26740	-51.694	0.10913
14	0.41060	7.78850	-0.07946	-51.323	0.10839	0.556	0.41061	-51.321	0.10839
15	0.55380	7.79010	-0.10228	-50.926	0.10399	0.581	0.55382	-50.925	0.10399
16	0.69710	7.79140	-0.12468	-50.282	0.09389	0.497	0.69712	-50.281	0.09389
17	0.84030	7.79260	-0.14644	-49.247	0.07633	0.454	0.84033	-49.246	0.07633
18	0.98350	7.79390	-0.16725	-47.802	0.04997	0.691	0.98353	-47.800	0.04997
19	1.10290	7.79530	-0.18373	-46.370	0.02062	1.044	1.10295	-46.365	0.02062

MEANLINE INPUT DATA - STREAMLINE 5

PT	Z	R	THETA	B*	T(Z)	PHI	X	B.M.	T(M)
1	-1.35910	7.36230	0.22858	-51.272	0.02034	3.018	-1.36071	-51.233	0.02036
2	-1.29570	7.36580	0.21771	-51.976	0.02624	3.042	-1.29722	-51.937	0.02626
3	-1.16890	7.37260	0.19519	-53.173	0.03824	3.085	-1.17024	-53.133	0.03828
4	-1.04210	7.37950	0.17189	-53.886	0.05030	3.113	-1.04325	-53.846	0.05035
5	-0.91520	7.38630	0.14821	-54.119	0.06211	3.111	-0.91616	-54.079	0.06217
6	-0.77570	7.39390	0.12213	-54.061	0.07450	3.049	-0.77646	-54.022	0.07457
7	-0.62350	7.40200	0.09391	-53.678	0.08696	2.900	-0.62405	-53.643	0.08703
8	-0.47130	7.40940	0.06634	-52.840	0.09798	2.675	-0.47167	-52.810	0.09805
9	-0.31920	7.41610	0.03979	-51.702	0.10726	2.406	-0.31942	-51.678	0.10732
10	-0.16700	7.42220	0.01435	-50.555	0.11454	2.134	-0.16710	-50.535	0.11469
11	-0.01480	7.42750	-0.01014	-49.647	0.12005	1.907	-0.01481	-49.631	0.12009
12	0.13740	7.43220	-0.03396	-49.003	0.12340	1.761	0.13747	-48.990	0.12343
13	0.28960	7.43680	-0.05727	-48.414	0.12458	1.708	0.28974	-48.402	0.12461
14	0.44180	7.44140	-0.08009	-47.836	0.12316	1.697	0.44201	-47.823	0.12319
15	0.59400	7.44590	-0.10244	-47.253	0.11734	1.680	0.59427	-47.241	0.11737
16	0.74620	7.45020	-0.12429	-46.532	0.10507	1.680	0.74654	-46.520	0.10509
17	0.89840	7.45470	-0.14548	-45.548	0.08454	1.801	0.89881	-45.534	0.08456
18	1.05050	7.46010	-0.16583	-44.224	0.05427	2.186	1.05100	-44.203	0.05429
19	1.17740	7.46490	-0.18201	-42.926	0.02086	2.641	1.17801	-42.896	0.02087

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 6

	R	Z	PT	THETA	B*	T(Z)	PHI	X	B*W	T(M)
1	-1.42790	6.93610	0.23274	-50.082	0.02047	4.607	-1.43281	-49.991	0.02051	
2	-1.36110	6.94160	0.22111	-50.676	0.02812	4.676	-1.36579	-50.583	0.02818	
3	-1.22750	6.95270	0.19719	-51.658	0.04359	4.815	-1.23173	-51.559	0.04368	
4	-1.09390	6.96410	0.17267	-52.130	0.05902	4.955	-1.09764	-52.026	0.05916	
5	-0.96030	6.97580	0.14801	-52.084	0.07400	5.071	-0.96352	-51.975	0.07418	
6	-0.81340	6.98900	0.12115	-51.709	0.08956	5.113	-0.81604	-51.598	0.08978	
7	-0.65310	7.00340	0.09246	-50.992	0.10501	5.015	-0.65511	-50.884	0.10525	
8	-0.49280	7.01720	0.06477	-49.843	0.11850	4.764	-0.49422	-49.745	0.11874	
9	-0.33240	7.03010	0.03834	-48.518	0.12970	4.465	-0.33330	-48.431	0.12992	
10	-0.17210	7.04220	0.01311	-47.360	0.13847	4.215	-0.17254	-47.282	0.13867	
11	-0.01180	7.05370	-0.01117	-46.399	0.14469	3.981	-0.01183	-46.330	0.14487	
12	0.14850	7.06460	-0.03467	-45.558	0.14823	3.741	0.14884	-45.497	0.14839	
13	0.30880	7.07470	-0.05746	-44.723	0.14894	3.514	0.30946	-44.669	0.14908	
14	0.46910	7.08420	-0.07957	-43.919	0.14604	3.370	0.47005	-43.869	0.14616	
15	0.62940	7.09350	-0.10106	-43.166	0.13755	3.363	0.63062	-43.117	0.13766	
16	0.78980	7.10290	-0.12194	-42.305	0.12155	3.458	0.79130	-42.253	0.12165	
17	0.95010	7.11290	-0.14211	-41.271	0.09629	3.683	0.95191	-41.212	0.09638	
18	1.11040	7.12390	-0.16148	-40.131	0.06025	4.117	1.11258	-40.058	0.06031	
19	1.24400	7.13360	-0.17701	-39.130	0.02102	4.580	1.24657	-39.040	0.02105	

MEANLINE INPUT DATA - STREAMLINE 7

	R	Z	PT	THETA	B*	T(Z)	PHI	X	B*W	T(M)
1	-1.49330	6.47520	0.23554	-48.981	0.02011	6.632	-1.50438	-48.790	0.02019	
2	-1.42340	6.48360	0.22305	-49.385	0.03020	6.751	-1.43400	-49.188	0.03032	
3	-1.28350	6.50050	0.19762	-50.018	0.05048	6.980	-1.29309	-49.808	0.05070	
4	-1.14370	6.51780	0.17189	-50.175	0.07053	7.178	-1.15221	-49.953	0.07086	
5	-1.00390	6.53560	0.14632	-49.845	0.08984	7.313	-1.01128	-49.614	0.09027	
6	-0.85010	6.55550	0.11876	-49.212	0.10972	7.337	-0.85621	-48.979	0.11024	
7	-0.68220	6.57720	0.08962	-48.195	0.12930	7.215	-0.68695	-47.969	0.12987	
8	-0.51440	6.59810	0.06190	-46.543	0.14620	6.995	-0.51785	-46.329	0.14677	
9	-0.34660	6.61820	0.03597	-44.652	0.16000	6.746	-0.34883	-44.453	0.16055	
10	-0.17880	6.63780	0.01165	-43.117	0.17060	6.502	-0.17991	-42.933	0.17111	
11	-0.01100	6.65660	-0.01150	-41.975	0.17591	6.218	-0.01106	-41.807	0.17838	
12	0.15680	6.67430	-0.03379	-41.090	0.18179	5.921	0.15768	-40.938	0.18221	
13	0.32460	6.69130	-0.05537	-40.272	0.18200	5.704	0.32634	-40.132	0.18238	
14	0.49240	6.70780	-0.07629	-39.490	0.17739	5.595	0.49496	-39.356	0.17773	
15	0.66020	6.72420	-0.09662	-38.753	0.16579	5.599	0.66356	-38.619	0.16610	
16	0.82800	6.74060	-0.11635	-37.986	0.14512	5.731	0.83218	-37.847	0.14539	
17	0.99580	6.75770	-0.13547	-37.073	0.11342	6.013	1.00086	-36.921	0.11365	
18	1.16360	6.77620	-0.15382	-35.890	0.06894	6.454	1.16966	-35.717	0.06909	
19	1.30340	6.79230	-0.16843	-34.746	0.02110	6.893	1.31041	-34.551	0.02115	

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 8

	Z	R	THETA	B*	T(Z)	PHI	X	B,M	T(M)
PT 1	-1.55280	5.96820	0.23716	-48.019	0.01913	9.197	-1.57429	-47.650	0.01927
2	-1.48010	5.98040	0.22357	-48.280	0.03203	9.349	-1.50063	-47.899	0.03227
3	-1.33470	6.00480	0.19616	-48.622	0.05783	9.618	-1.35321	-48.220	0.05829
4	-1.18930	6.02960	0.16876	-48.451	0.08314	9.787	-1.20570	-48.034	0.08382
5	-1.04390	6.05480	0.14193	-47.679	0.10728	9.839	-1.05814	-47.5	0.10815
6	-0.88390	6.08260	0.11363	-46.319	0.13181	9.799	-0.89575	-45.898	0.13282
7	-0.70950	6.11270	0.08461	-44.390	0.15551	9.672	-0.71880	-43.980	0.15660
8	-0.53500	6.14210	0.05778	-42.162	0.17558	9.475	-0.54184	-41.771	0.17666
9	-0.36050	6.17090	0.03307	-40.058	0.19176	9.244	-0.36438	-39.690	0.19279
10	-0.18600	6.19900	0.01005	-38.463	0.20394	8.999	-0.18824	-38.118	0.20491
11	-0.01150	6.22620	-0.01176	-37.212	0.21198	8.728	-0.01163	-36.891	0.21288
12	0.16300	6.25250	-0.03257	-36.135	0.21566	8.464	0.16485	-35.836	0.21648
13	0.33750	6.27810	-0.05255	-35.172	0.21460	8.284	0.34122	-34.890	0.21534
14	0.51200	6.30330	-0.07177	-34.267	0.20730	8.206	0.51754	-33.993	0.20797
15	0.68640	6.32840	-0.09028	-33.384	0.19171	8.243	0.69375	-33.111	0.19231
16	0.86090	6.35380	-0.10812	-32.540	0.16586	8.454	0.87011	-32.256	0.16638
17	1.03540	6.38010	-0.12531	-31.636	0.12787	8.821	1.04661	-31.332	0.12829
18	1.20990	6.40810	-0.14176	-30.477	0.07599	9.252	1.22330	-30.150	0.07624
19	1.35530	6.43220	-0.15480	-29.352	0.02109	9.627	1.37070	-29.006	0.02116

MEANLINE INPUT DATA - STREAMLINE 9

	Z	R	THETA	B*	T(Z)	PHI	X	B,M	T(M)
P. 1	-1.59080	5.39620	0.23550	-46.729	0.01859	12.310	-1.62947	-46.064	0.01882
2	-1.51580	5.41310	0.22073	-46.826	0.03419	12.498	-1.55268	-46.140	0.03462
3	-1.36580	5.44710	0.19125	-46.843	0.06523	12.811	-1.39894	-46.122	0.06610
4	-1.21580	5.48140	0.16217	-46.330	0.09548	12.932	-1.24506	-45.594	0.09676
5	-1.06570	5.51590	0.13413	-45.113	0.12417	12.865	-1.09107	-44.385	0.12574
6	-0.90070	5.55340	0.10521	-43.008	0.15304	12.741	-0.92186	-42.296	0.15480
7	-0.72070	5.59390	0.07650	-40.224	0.18056	12.616	-0.73736	-39.535	0.18238
8	-0.54070	5.63400	0.05056	-37.825	0.20363	12.443	-0.55297	-37.167	0.20543
9	-0.36070	5.67340	0.02670	-35.900	0.22211	12.214	-0.36872	-35.279	0.22384
10	-0.18070	5.71190	0.00454	-34.161	0.23577	11.962	-0.18464	-33.578	0.23738
11	-0.00070	5.74960	-0.01616	-32.649	0.24431	11.750	-0.00071	-32.100	0.24580
12	0.17940	5.78680	-0.03566	-31.350	0.24743	11.609	0.18319	-30.826	0.24880
13	0.35940	5.82360	-0.05409	-30.114	0.24457	11.532	0.36692	-29.610	0.24581
14	0.53940	5.86020	-0.07152	-28.866	0.23412	11.536	0.55062	-28.374	0.23522
15	0.71940	5.89700	-0.08796	-27.585	0.21429	11.658	0.73437	-27.098	0.21523
16	0.89940	5.93440	-0.10343	-26.310	0.18336	11.941	0.91824	-25.815	0.18414
17	1.07940	5.97300	-0.11798	-25.073	0.13966	12.330	1.10236	-24.564	0.14024
18	1.25950	6.01320	-0.13165	-23.884	0.08157	12.679	1.28684	-23.364	0.08189
19	1.40950	6.04750	-0.14241	-22.903	0.02103	12.932	1.44066	-22.380	0.02111

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 10

			T (M)
Pt	Z	B*	X
1	-1.56570	R	-1.63192
2	-1.48960	0.22872	-1.44.303
3	-1.33730	0.21250	-1.55263
4	-1.18540	0.18078	-1.39374
5	-1.03290	0.15030	-1.23480
6	-0.86540	0.12152	-1.07588
7	-0.68270	0.09231	-0.90111
8	-0.50010	0.06370	-0.70163
9	-0.31740	0.03830	-0.52037
10	-0.13470	0.10520	-0.33015
11	0.04790	0.01554	-0.14007
12	0.23060	0.00501	-0.04980
13	0.41330	-0.00501	-0.23976
14	0.59600	-0.02365	-0.27032
15	0.77860	-0.02365	-0.25620
16	0.96130	-0.02365	-0.23204
17	1.14400	-0.02365	-0.19645
18	1.32670	-0.02365	-0.10255
19	1.47890	-0.02365	-0.11145
PT	Z	THETA	T (Z)
	R	PHI	X
1	4.73500	-45.466	16.214
2	4.75780	-45.198	16.396
3	4.80340	-44.519	16.688
4	4.84920	-43.423	16.770
5	4.89490	-41.780	16.659
6	4.94480	-39.384	16.505
7	4.99870	-36.378	16.379
8	5.05220	-33.565	16.238
9	5.10520	-31.112	16.084
10	5.15750	-28.911	15.954
11	5.20950	-26.824	15.889
12	5.26150	-24.793	15.905
13	5.31360	-22.856	15.987
14	5.36610	-20.919	16.125
15	5.41920	-18.945	16.331
16	5.47320	-17.198	16.670
17	5.52840	-15.777	17.041
18	5.58500	-14.541	17.217
19	5.63280	-0.08524	-13.563

MEAN INE INBUILT DATA - STREAMS INC 11

P.T.	Z	R	THETA	B+	T(Z)	PHI	X	B.M.	T(M)
1	1.50890	3.90510	0.22115	-43.343	0.02534	21.674	-1.62430	-41.252	0.02620
2	-1.43360	3.93570	0.20314	-42.960	0.04366	21.846	-1.54322	-40.838	0.04514
3	-1.28290	3.99710	0.16833	-41.965	0.07990	22.116	-1.38069	-39.799	0.08256
4	-1.13230	4.05830	0.13557	-40.324	0.11504	22.169	-1.21808	-38.169	0.11863
5	-0.98160	4.11940	0.10552	-37.985	0.14837	22.021	-1.05542	-35.900	0.15249
6	-0.81590	4.18620	0.07593	-35.093	0.18217	21.815	-0.87681	-33.117	0.18648
7	-0.63520	4.25830	0.04758	-31.890	0.21496	21.625	-0.68231	-30.045	0.21915
8	-0.45440	4.32950	0.02300	-28.638	0.24304	21.442	-0.48794	-26.943	0.24686
9	-0.27370	4.40010	0.00185	-25.500	0.26595	21.335	-0.29389	-23.955	0.26927
10	-0.09290	4.47070	-0.01635	-22.646	0.28329	21.371	-0.0978	-21.232	0.28112
11	0.08790	4.54160	-0.03200	-19.995	0.29474	21.524	0.09446	-18.701	0.29709
12	0.26860	4.61320	-0.04539	-17.457	0.29993	21.782	0.28887	-16.278	0.30181
13	0.44940	4.68600	-0.05670	-14.987	0.29824	22.152	0.48381	-13.926	0.29967
14	0.63020	4.76030	-0.06610	-12.613	0.28759	22.620	0.67933	-11.670	0.28861
15	0.81090	4.83660	-0.07374	-10.299	0.26525	23.177	0.87548	-9.484	0.26591
16	0.99170	4.91150	-0.07967	-8.810	0.22843	23.835	1.07264	-7.151	0.22878
17	1.17250	4.99620	-0.08380	-5.096	0.17436	24.326	1.27073	-4.646	0.17448
18	1.35320	5.07810	-0.08614	-2.328	0.10036	24.209	1.46902	-2.123	0.10037
19	1.50390	5.14680	-0.08674	0.010	0.02158	23.794	1.63310	0.009	0.02158

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 12

	R	THETA	B*	T(Z)	PHI	X	B'M	T(M)
PT 1	-1.48900	3.36120	0.22123	-40.649	0.03331	25.852	-1.64875	-37.692
2	-1.41530	3.39770	0.20271	-40.009	0.05419	25.907	-1.56664	-37.053
3	-1.26790	3.47030	0.16754	-38.587	0.09544	25.944	-1.40272	-35.660
4	-1.12040	3.54170	0.13495	-36.893	0.13530	25.764	-1.23879	-34.059
5	-0.97300	3.61190	0.10509	-34.885	0.17293	25.422	-1.07535	-32.199
6	-0.81080	3.68840	0.07550	-32.367	0.21075	25.151	-0.89598	-29.844
7	-0.63390	3.77140	0.04712	-29.331	0.24670	25.068	-0.70084	-26.975
8	-0.45690	3.85390	0.02271	-26.118	0.27617	25.065	-0.50525	-23.947
9	-0.28000	3.93660	0.00198	-22.942	0.29830	25.167	-0.30990	-20.961
10	-0.10310	4.02020	-0.01550	-20.019	0.31227	25.428	-0.11425	-18.214
11	0.07390	4.10490	-0.03025	-17.416	0.31731	25.786	0.08202	-15.773
12	0.25080	4.19110	-0.04265	-15.019	0.31285	26.249	0.27884	-13.531
13	0.42770	4.27930	-0.05292	-12.558	0.29910	26.887	0.47661	-11.237
14	0.60470	4.37030	-0.06106	-9.867	0.27631	27.596	0.67569	-8.763
15	0.78160	4.46430	-0.06696	-6.776	0.24463	28.286	0.87593	-5.974
16	0.95850	4.56140	-0.07035	-2.969	0.20418	29.062	1.07755	-2.596
17	1.13550	4.66060	-0.07086	1.555	0.15503	29.585	1.28068	1.352
18	1.31240	4.76080	-0.06826	6.418	0.09742	29.176	1.48384	5.609
19	1.45980	4.84460	-0.06368	10.578	0.04307	28.329	1.65201	9.335

MEANLINE INPUT DATA - STREAMLINE 13

	R	THETA	B*	T(Z)	PHI	X	B'M	T(M)
PT 1	-1.46930	2.65330	0.23827	-36.435	0.05041	31.199	-1.68831	-32.270
2	-1.39860	2.69470	0.21888	-36.023	0.06912	30.603	-1.60592	-32.041
3	-1.25710	2.77680	0.18190	-35.063	0.10651	29.513	-1.44246	-31.416
4	-1.11560	2.85610	0.14740	-33.840	0.14304	28.724	-1.28053	-30.453
5	-0.97410	2.93290	0.11555	-32.243	0.17791	28.302	-1.11954	-29.047
6	-0.81840	3.01620	0.08393	-29.905	0.21365	28.181	-0.94285	-26.883
7	-0.64860	3.10760	0.05398	-26.732	0.24875	28.431	-0.75005	-23.889
8	-0.47880	3.20060	0.02881	-23.343	0.27877	29.100	-0.55641	-20.660
9	-0.30900	3.29700	0.00793	-20.285	0.30288	30.104	-0.36116	-17.732
10	-0.13920	3.39790	-0.00959	-17.896	0.32018	31.281	-0.16370	-15.428
11	0.03060	3.50340	-0.02448	-15.744	0.32992	32.389	0.03620	-13.391
12	0.20040	3.61310	-0.03689	-13.313	0.33124	33.335	0.23838	-11.183
13	0.37020	3.72660	-0.04659	-10.180	0.32362	34.186	0.44264	-8.449
14	0.54000	3.84380	-0.05309	-6.107	0.30700	35.003	0.64891	-5.009
15	0.70980	3.96430	-0.05586	-0.977	0.28121	35.786	0.85723	-0.793
16	0.87960	4.08830	-0.05437	5.209	0.24587	36.379	1.06740	4.197
17	1.04940	4.21400	-0.04817	12.133	0.20102	36.561	1.27868	9.797
18	1.21920	4.33860	-0.03702	19.205	0.14745	36.136	1.48962	15.713
19	1.36070	4.44150	-0.02393	24.944	0.09632	35.488	1.66414	20.743

PHASE V ROTOR

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 1

NB 20

MEANLINE DATA				SURFACE COORDINATES			
PT	PCT X	Y	B.M.	T (M)	PT	X S	Y S
1	0.	-1.12850	1.78792	-55.160	0.01882	-1.12850	1.78792
2	0.02500	-1.07764	1.71376	-55.923	0.02265	-1.13253	1.78938
3	0.05000	-1.02673	1.63749	-56.644	0.02655	-1.13103	1.78568
4	0.07500	-0.97584	1.55918	-57.311	0.03051	-1.08699	1.72010
5	0.10000	-0.92495	1.47893	-57.916	0.03451	-1.03781	1.64478
6	0.12500	-0.87406	1.39688	-58.458	0.03854	-0.98868	1.56742
7	0.15000	-0.82318	1.31317	-58.939	0.04257	-0.93957	1.46976
8	0.17500	-0.77229	1.22795	-59.373	0.04658	-0.89049	1.38680
9	0.20000	-0.72140	1.14130	-59.769	0.05057	-0.84141	1.30219
10	0.23000	-0.66034	1.03560	-60.185	0.05330	-0.79233	1.23981
11	0.26000	-0.59927	0.92829	-60.510	0.05933	-0.74325	1.12857
12	0.29000	-0.53821	0.81985	-60.691	0.06443	-0.68432	1.02185
13	0.32000	-0.47714	0.71102	-60.684	0.06873	-0.62535	0.91354
14	0.35000	-0.41608	0.60260	-60.518	0.07279	-0.56630	0.80408
15	0.38000	-0.35501	0.49516	-60.239	0.07657	-0.50710	0.69420
16	0.41000	-0.29395	0.38908	-59.899	0.08006	-0.44776	0.58468
17	0.44000	-0.23288	0.28449	-59.549	0.08323	-0.38825	0.47616
18	0.47000	-0.17182	0.18129	-59.226	0.08608	-0.32858	0.36901
19	0.50000	-0.11075	0.07931	-58.959	0.08860	-0.26875	0.26340
20	0.53000	-0.04969	-0.02173	-58.760	0.09078	-0.20879	0.15927
21	0.56000	0.01138	-0.12213	-58.630	0.09261	-0.14871	0.05647
22	0.59000	0.07244	-0.22211	-58.547	0.09408	-0.08849	-0.04527
23	0.62000	0.13351	-0.32182	-58.482	0.09516	-0.02816	-0.09802
24	0.65000	0.19457	-0.42127	-58.416	0.09587	-0.03232	-0.24665
25	0.68000	0.25564	-0.52043	-58.326	0.09619	-0.09295	-0.34669
26	0.71030	0.31670	-0.61916	-58.194	0.09601	-0.15374	-0.44638
27	0.74000	0.37777	-0.71728	-58.004	0.09516	-0.21471	-0.54568
28	0.77000	0.43884	-0.81457	-57.757	0.09333	-0.27591	-0.64446
29	0.80000	0.49990	-0.91084	-57.456	0.09020	-0.33742	-0.74249
30	0.83000	0.56096	-1.00588	-57.092	0.08547	-0.39937	-0.83947
31	0.86000	0.62203	-1.09948	-56.651	0.07890	-0.46188	-0.93510
32	0.89000	0.68310	-1.19136	-56.106	0.07035	-0.52509	-1.02910
33	0.92000	0.74416	-1.28115	-55.431	0.05966	-0.58908	-1.12117
34	0.95000	0.80523	-1.36850	-54.635	0.04643	-0.65390	-1.21097
35	0.97500	0.85611	-1.43924	-53.893	0.03335	-0.71960	-1.29807
36	1.00000	0.90700	-1.50801	-53.100	0.01923	-0.78629	-1.38194

CHORD 3 87382 CAMBER 2.061 STAGGER -58.301

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE

3

MEANLINE DATA				SURFACE COORDINATES				
PT	PC1 X	X	Y	B+M	T (M)	PT	XS	
1	0.	-1.20464	1.76096	0.01945	1	-1.20464	1.76096	
2	0.02500	-1.14914	1.68421	-54.770	0.02362	2	-1.20863	1.75411
3	0.05000	-1.09364	1.60546	-55.159	0.02785	3	-1.19088	1.75898
4	0.07500	-1.03814	1.52477	-55.789	0.03213	4	-1.15875	1.67735
5	0.10000	-0.98265	1.44224	-56.363	0.03645	5	-1.10507	1.59751
6	0.12500	-0.92715	1.35799	-56.877	0.04078	6	-1.05143	1.51574
7	0.15000	-0.87165	1.27217	-57.328	0.04511	7	-0.99782	1.43215
8	0.17500	-0.81615	1.18496	-57.716	0.04942	8	-0.94422	1.34685
9	0.20000	-0.76065	1.09654	-58.042	0.05368	9	-0.89063	1.26000
10	0.23000	-0.69405	0.98913	-58.342	0.05870	10	-0.83704	1.17177
11	0.26000	-0.62745	0.88068	-58.528	0.06359	11	-0.78342	1.08234
12	0.29000	-0.56086	0.77173	-58.573	0.06827	12	-0.71904	0.97372
13	0.32000	-0.49426	0.66293	-58.455	0.07273	13	-0.65457	0.86408
14	0.35000	-0.42766	0.55495	-58.195	0.07690	14	-0.58998	0.75393
15	0.38000	-0.36106	0.44829	-57.828	0.08078	15	-0.52525	0.64391
16	0.41000	-0.29446	0.34328	-57.393	0.08431	16	-0.46034	0.53468
17	0.44000	-0.22786	0.24009	-56.931	0.08750	17	-0.39525	0.42678
18	0.47000	-0.16126	0.13869	-56.484	0.09033	18	-0.32997	0.32057
19	0.50000	-0.09467	0.03890	-56.088	0.09279	19	-0.26453	0.21622
20	0.53000	-0.02807	-0.05954	-55.762	0.09488	20	-0.19892	0.11375
21	0.56000	0.03853	-0.15692	-55.517	0.09659	21	-0.13317	0.01301
22	0.59000	0.10513	-0.25354	-55.336	0.09791	22	-0.06729	-0.08623
23	0.62000	0.17173	-0.34960	-55.199	0.09883	23	-0.00128	-0.18427
24	0.65000	0.23833	-0.44521	-55.083	0.09935	24	0.06486	-0.28139
25	0.68000	0.30493	-0.5040	-54.963	0.09947	25	0.13115	-0.37780
26	0.71000	0.37152	-0.63513	-54.814	0.09897	26	0.19759	-0.47364
27	0.74000	0.43812	-0.72927	-54.618	0.09770	27	0.26121	-0.56895
28	0.77000	0.50472	-0.82263	-54.373	0.09539	28	0.33108	-0.66365
29	0.80000	0.57132	-0.91508	-54.083	0.09176	29	0.39829	-0.75755
30	0.83000	0.63792	-1.00646	-53.734	0.08657	30	0.46595	-0.85041
31	0.86000	0.70452	-1.09655	-53.303	0.07960	31	0.53416	-0.94200
32	0.89000	0.77111	-1.18505	-52.743	0.07076	32	0.60302	-1.03207
33	0.92000	0.83771	-1.27151	-52.013	0.05991	33	0.67260	-1.12034
34	0.95000	0.90431	-1.35548	-51.124	0.04671	34	0.74295	-1.20647
35	0.97500	0.95981	-1.42331	-50.281	0.03382	35	0.81410	-1.28995
36	1.00000	1.01531	-1.48906	-49.372	0.01997	36	0.88613	-1.37014

PHASE V ROTOR

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 4

MEANLINE DATA

PT	PCT X	X	Y	B.M.	T (N)	PT	X S	Y S	XP	YP
1	0	-1.28457	1.73494	-52.477	0.0206	1	-1.28457	1.73494	-1.28457	1.73494
2	0.02500	-1.22489	1.65619	-53.200	0.02489	2	-1.28853	1.72778	-1.27643	1.73689
3	0.05000	-1.16520	1.57540	-53.869	0.02979	3	-1.28663	1.72075	-1.27032	1.73324
4	0.07500	-1.10551	1.49273	-54.456	0.03474	4	-1.23485	1.64873	-1.21492	1.66364
5	0.10000	-1.04582	1.40841	-54.936	0.03972	5	-1.17723	1.56662	-1.15317	1.58418
6	0.12500	-0.98613	1.32275	-55.308	0.04470	6	-1.11964	1.48263	-1.09138	1.50283
7	0.15000	-0.92645	1.23606	-55.577	0.04965	7	-1.06208	1.39700	-1.02955	1.41982
8	0.17500	-0.86676	1.14863	-55.776	0.05453	8	-1.00451	1.31003	-0.96775	1.33547
9	0.20000	-0.80707	1.06061	-55.934	0.05933	9	-0.94692	1.22203	-0.90597	1.25010
10	0.23000	-0.73544	0.95438	-56.075	0.06495	10	-0.88930	1.13329	-0.84421	1.16396
11	0.26000	-0.66382	0.84770	-56.159	0.07038	11	-0.83164	1.04399	-0.78250	1.07722
12	0.29000	-0.59219	0.74085	-56.154	0.07558	12	-0.76239	0.93626	-0.70850	0.97251
13	0.32000	-0.52057	0.63425	-56.031	0.08051	13	-0.69304	0.82810	-0.63459	0.86730
14	0.35000	-0.44894	0.52839	-55.781	0.08513	14	-0.62358	0.71980	-0.56081	0.76189
15	0.38000	-0.37732	0.42376	-55.407	0.08939	15	-0.55395	0.61175	-0.48718	0.65674
16	0.41000	-0.30569	0.32082	-54.913	0.09327	16	-0.48414	0.50445	-0.41374	0.55233
17	0.44000	-0.23406	0.21995	-54.320	0.09675	17	-0.41411	0.39839	-0.34052	0.44914
18	0.47000	-0.16244	0.12133	-53.705	0.09982	18	-0.34385	0.29402	-0.26753	0.34763
19	0.50000	-0.09081	0.02480	-53.153	0.10245	19	-0.27336	0.19173	-0.19477	0.24817
20	0.53000	-0.01919	0.06997	-52.704	0.10467	20	-0.20266	0.09178	-0.12221	0.15087
21	0.56000	0.05244	-0.16341	-52.374	0.10646	21	-0.13181	0.05932	-0.04982	0.05553
22	0.59000	0.12406	-0.25590	-52.121	0.10780	22	-0.06082	0.10168	0.02245	0.03825
23	0.62000	0.19569	-0.34760	-51.899	0.10669	23	0.01028	0.19591	0.09460	0.13092
24	0.65000	0.26732	-0.43861	-51.694	0.10913	24	0.08152	0.28899	0.16661	0.22280
25	0.68000	0.33894	-0.52897	-51.503	0.10910	25	0.15292	0.38113	0.23846	0.31407
26	0.71000	0.41057	-0.61873	-51.321	0.10839	26	0.22450	0.47243	0.31013	0.40478
27	0.74000	0.48219	-0.70792	-51.139	0.10678	27	0.29625	0.56292	0.38163	0.49501
28	0.77000	0.55382	-0.79648	-50.925	0.10399	28	0.36826	0.65260	0.45288	0.58486
29	0.80000	0.62544	-0.88427	-50.645	0.09978	29	0.44062	0.74141	0.52376	0.67442
30	0.83000	0.69707	-0.97107	-50.281	0.09390	30	0.51345	0.82955	0.59418	0.76370
31	0.86000	0.76870	-1.05661	-49.816	0.08611	31	0.58687	0.91591	0.66402	0.85264
32	0.89000	0.84032	-1.14059	-49.246	0.07633	32	0.66096	1.0108	0.73318	0.94107
33	0.92000	0.91195	-1.22275	-48.569	0.06443	33	0.73098	1.08439	0.80159	1.02883
34	0.95000	0.98357	-1.30283	-47.800	0.04996	34	0.81141	1.16551	0.86923	1.11568
35	0.97500	1.04326	-1.36787	-47.101	0.03582	35	0.88779	1.24406	0.93610	1.20143
36	1.00000	1.10295	-1.43129	-46.365	0.02062	36	0.96507	1.31951	1.00208	1.28605

CHORD 3.96551

CAMBER 6.112

STAGGER 0.0

ANGLE -52.982

MERIDIONAL ALBEDO - STREAMLINE 5

MEANLINE DATA		SURFACE COORDINATES			
PCT	X	B+M	T (M,	Y	YP
1	-1.36071	1.69040	-51.233	0.02036	1.69040
2	-1.29724	1.61036	-51.937	0.02626	-1.36071
3	-1.23377	1.52834	-52.583	0.03224	-1.35247
4	-1.17030	1.44452	-53.133	0.03827	1.69257
5	-1.10683	1.35919	-53.555	0.04432	-1.34617
6	-1.04337	1.27276	-53.845	0.05034	1.68901
7	-0.97990	1.18560	-54.009	0.05629	1.68901
8	-0.91643	1.09089	-54.079	0.06215	-1.34617
9	-0.20000	0.85296	-54.085	0.06787	1.68901
10	-0.23000	0.77680	-54.022	0.07454	1.61845
11	-0.26000	0.70064	-53.884	0.08093	-1.20967
12	-0.29000	0.62448	-53.645	0.08700	-1.20967
13	-0.32000	0.54832	-53.282	0.09271	1.61845
14	-0.35000	0.47216	-52.813	0.09802	-1.20967
15	-0.38000	0.39599	-52.267	0.10289	1.61845
16	-0.41000	0.31983	-52.9584	-0.51.681	-1.20967
17	-0.44000	-0.24367	0.20048	-51.092	0.11123
18	-0.47000	-0.16751	0.10706	-50.538	0.11467
19	-0.50000	-0.09135	0.01536	-50.048	0.11762
20	-0.53000	-0.01519	-0.07487	-49.633	0.12008
21	-0.56000	0.06097	-0.16391	-49.292	0.12343
22	0.59000	0.13714	-0.25196	-48.991	0.12343
23	0.62000	0.21330	-0.33909	-48.696	0.12430
24	0.65000	0.28946	-0.42533	-48.403	0.12461
25	0.68000	0.36562	-0.51068	-48.111	0.12432
26	0.71000	0.44176	-0.59517	-47.824	0.12319
27	0.74000	0.51794	-0.67882	-47.540	0.12097
28	0.77000	0.59410	-0.76162	-47.241	0.11738
29	0.80000	0.67027	-0.84352	-46.907	0.11218
30	0.83000	0.74643	-0.92439	-46.521	0.10511
31	0.86000	0.82259	-1.00409	-46.068	0.09594
32	0.89000	0.89875	-1.08244	-45.535	0.08457
33	0.92000	0.97491	-1.15921	-44.909	0.07084
34	0.95000	1.05107	-1.23422	-44.203	0.05427
35	0.97500	1.11454	-1.29527	-43.564	0.03616
36	1.00000	1.17801	-1.35494	-42.896	0.02087
				36	1.03215
				37	1.10139
				38	1.16227
				39	1.16975
				40	1.17801

PHASE V ROTOR

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE

6

NB 20

MEANLINE DATA				SURFACE COORDINATES			
PT	X	Y	Z	PT	X	Y	Z
1	0.	-1.43281	1.62720	-49.991	0.02051	-1.43281	1.62720
2	0.	0.02500	-1.36582	1.54654	-50.582	0.02817	1.61965
3	0.	0.05000	-1.29884	1.46424	-51.120	0.03590	1.43437
4	0.	0.07500	-1.23185	1.38049	-51.559	0.04367	1.37670
5	0.	0.10000	-1.16487	1.29560	-51.863	0.05143	1.31281
6	0.	0.12500	-1.09788	1.21000	-52.026	0.05913	1.24895
7	0.	0.15000	-1.03090	1.12411	-52.051	0.06671	1.18509
8	0.	0.17500	-0.96391	1.03831	-51.976	0.07414	1.12119
9	0.	0.20000	-0.89693	0.95285	-51.836	0.08137	1.05720
10	0.	0.23000	-0.81655	0.85099	-51.599	0.08973	1.09312
11	0.	0.26000	-0.73617	0.75011	-51.292	0.09769	1.02892
12	0.	0.29000	-0.65579	0.65049	-50.888	0.10519	0.85171
13	0.	0.32000	-0.57541	0.55250	-50.365	0.11221	0.77428
14	0.	0.35000	-0.49502	0.45649	-49.751	0.11868	0.69660
15	0.	0.38000	-0.41464	0.36263	-49.092	0.12457	0.61861
16	0.	0.41000	-0.33426	0.27093	-48.439	0.12986	0.51672
17	0.	0.44000	-0.25388	0.18124	-47.836	0.13455	0.41815
18	0.	0.47000	-0.17350	0.09334	-47.288	0.13863	0.32184
19	0.	0.50000	-0.09312	0.0703	-46.790	0.14206	0.22785
20	0.	0.53000	-0.01274	-0.07785	-46.335	0.14435	0.13608
21	0.	0.56000	0.06764	-0.16144	-45.911	0.14695	0.12443
22	0.	0.59000	0.14803	-0.24383	-45.501	0.14838	0.106513
23	0.	0.62000	0.22841	-0.32504	-45.087	0.14911	0.01487
24	0.	0.65000	0.30879	-0.40509	-44.672	0.14908	0.09511
25	0.	0.68000	0.38917	-0.48399	-44.264	0.14819	0.17561
26	0.	0.71000	0.46955	-0.56179	-43.872	0.14618	0.14489
27	0.	0.74000	0.54993	-0.63856	-43.497	0.14275	0.12786
28	0.	0.77000	0.63031	-0.71433	-43.118	0.13768	0.13745
29	0.	0.80000	0.71069	-0.78907	-42.708	0.13075	0.14890
30	0.	0.83000	0.79108	-0.86269	-42.254	0.12168	0.1890
31	0.	0.86000	0.87146	-0.93508	-41.753	0.11026	0.2375
32	0.	0.89000	0.95184	-1.00616	-41.212	0.09632	0.2795
33	0.	0.92000	1.03222	-1.07587	-40.646	0.07993	0.3475
34	0.	0.95000	1.11260	-1.14417	-40.058	0.06031	0.92008
35	0.	0.97500	1.17958	-1.19999	-39.554	0.04134	0.90619
36	1.	0.00000	1.24657	-1.25482	-39.040	0.02105	1.09319
							1.16725
							1.19275
							1.25736
							1.24588
							1.24916
							1.24657

PT	X	Y	Z	T(M)	X	Y	Z
1	0.	-1.43281	1.62720	-49.991	0.02051	-1.43281	1.62720
2	0.	0.02500	-1.36582	1.54654	-50.582	0.02817	1.63659
3	0.	0.05000	-1.29884	1.46424	-51.120	0.03590	1.43437
4	0.	0.07500	-1.23185	1.38049	-51.559	0.04367	1.37670
5	0.	0.10000	-1.16487	1.29560	-51.863	0.05143	1.31281
6	0.	0.12500	-1.09788	1.21000	-52.026	0.05913	1.24895
7	0.	0.15000	-1.03090	1.12411	-52.051	0.06671	1.18509
8	0.	0.17500	-0.96391	1.03831	-51.976	0.07414	1.12119
9	0.	0.20000	-0.89693	0.95285	-51.836	0.08137	1.05720
10	0.	0.23000	-0.81655	0.85099	-51.599	0.08973	1.09312
11	0.	0.26000	-0.73617	0.75011	-51.292	0.09769	1.02892
12	0.	0.29000	-0.65579	0.65049	-50.888	0.10519	0.85171
13	0.	0.32000	-0.57541	0.55250	-50.365	0.11221	0.77428
14	0.	0.35000	-0.49502	0.45649	-49.751	0.11868	0.69660
15	0.	0.38000	-0.41464	0.36263	-49.092	0.12457	0.61861
16	0.	0.41000	-0.33426	0.27093	-48.439	0.12986	0.51672
17	0.	0.44000	-0.25388	0.18124	-47.836	0.13455	0.41815
18	0.	0.47000	-0.17350	0.09334	-47.288	0.13863	0.32184
19	0.	0.50000	-0.09312	0.0703	-46.790	0.14206	0.22785
20	0.	0.53000	-0.01274	-0.07785	-46.335	0.14435	0.13608
21	0.	0.56000	0.06764	-0.16144	-45.911	0.14695	0.12443
22	0.	0.59000	0.14803	-0.24383	-45.501	0.14838	0.106513
23	0.	0.62000	0.22841	-0.32504	-45.087	0.14911	0.01487
24	0.	0.65000	0.30879	-0.40509	-44.672	0.14908	0.09511
25	0.	0.68000	0.38917	-0.48399	-44.264	0.14819	0.17561
26	0.	0.71000	0.46955	-0.56179	-43.872	0.14618	0.14489
27	0.	0.74000	0.54993	-0.63856	-43.497	0.14275	0.12786
28	0.	0.77000	0.63031	-0.71433	-43.118	0.13768	0.13745
29	0.	0.80000	0.71069	-0.78907	-42.708	0.13075	0.14890
30	0.	0.83000	0.79108	-0.86269	-42.254	0.12168	0.1890
31	0.	0.86000	0.87146	-0.93508	-41.753	0.11026	0.2375
32	0.	0.89000	0.95184	-1.00616	-41.212	0.09632	0.2795
33	0.	0.92000	1.03222	-1.07587	-40.646	0.07993	0.3475
34	0.	0.95000	1.11260	-1.14417	-40.058	0.06031	0.92008
35	0.	0.97500	1.17958	-1.19999	-39.554	0.04134	0.90619
36	1.	0.00000	1.24657	-1.25482	-39.040	0.02105	1.09319
							1.16725
							1.21593
							1.25736
							1.24588
							1.24916
							1.24657

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 7

PT	MEANLINE DATA			SURFACE COORDINATES				
	PCT X	X	Y	B.M	T (M)	YS	XP	YP
1	0.	-1.50438	1.54463	-48.790	0.02019	1	-1.50438	-1.50438
2	0.02500	-1.43401	1.46370	-49.188	0.03032	2	-1.50798	-1.49629
3	0.05000	-1.36364	1.38168	-49.542	0.04049	3	-1.50569	-1.48978
4	0.07500	-1.29327	1.29875	-49.808	0.05067	4	-1.44548	-1.42253
5	0.10000	-1.22290	1.21522	-49.948	0.06080	5	-1.37904	-1.39482
6	0.12500	-1.15253	1.13147	-49.954	0.07081	6	-1.31262	-1.27391
7	0.15000	-1.08216	1.04790	-49.830	0.08063	7	-1.24617	-1.19563
8	0.17500	-1.01179	0.96484	-49.616	0.09020	8	-1.17963	-1.10869
9	0.20000	-0.94142	0.88248	-49.352	0.09947	9	-1.1297	-1.02189
10	0.23000	-0.85698	0.78474	-48.983	0.11014	10	-1.04614	-0.93561
11	0.26000	-0.77253	0.68838	-48.544	0.12025	11	-0.97916	-0.85008
12	0.29000	-0.68809	0.59369	-47.978	0.12975	12	-0.89853	-0.74860
13	0.32000	-0.60365	0.50115	-47.231	0.13857	13	-0.81760	-0.64858
14	0.35000	-0.51920	0.41123	-46.344	0.14665	14	-0.73628	-0.55026
15	0.38000	-0.43476	0.32248	-45.394	0.15395	15	-0.65451	-0.45410
16	0.41000	-0.35031	0.23995	-44.468	0.16044	16	-0.57225	-0.36061
17	0.44000	-0.26587	0.15826	-43.650	0.16614	17	-0.48956	-0.27012
18	0.47000	-0.18143	0.07872	-42.945	0.17103	18	-0.40651	-0.18270
19	0.50000	-0.09698	0.00097	-42.338	0.17510	19	-0.32321	-0.09815
20	0.53000	-0.01254	-0.07525	-41.816	0.17833	20	-0.23969	-0.01612
21	0.56000	0.07190	-0.15018	-41.361	0.18070	21	-0.15595	-0.06374
22	0.59000	0.15635	-0.22398	-40.945	0.18219	22	-0.07199	-0.14170
23	0.62000	0.24079	-0.29672	-40.538	0.18280	23	0.01220	-0.21799
24	0.65000	0.32524	-0.36843	-40.137	0.18239	24	0.09665	-0.29279
25	0.68000	0.40968	-0.43913	-39.743	0.18081	25	0.18139	-0.36618
26	0.71000	0.49412	-0.50887	-39.360	0.17777	26	0.26645	-0.43814
27	0.74000	0.57857	-0.57767	-38.989	0.17297	27	0.35188	-0.50864
28	0.77000	0.66301	-0.64558	-38.621	0.16615	28	0.43775	-0.57759
29	0.80000	0.74745	-0.71259	-38.245	0.15707	29	0.52415	-0.64489
30	0.83000	0.83190	-0.77868	-37.848	0.14544	30	0.61116	-0.71048
31	0.86000	0.91634	-0.84379	-37.414	0.13100	31	0.69884	-0.77427
32	0.89000	1.00078	-0.90783	-36.921	0.11366	32	0.78728	-0.83610
33	0.92000	1.08523	-0.97064	-36.353	0.09324	33	0.87654	-0.89582
34	0.95000	1.16967	-1.03209	-35.717	0.06909	34	0.96664	-0.95327
35	0.97500	1.24004	-1.08216	-35.146	0.04590	35	1.05759	-1.00819
36	1.00000	1.31041	-1.13116	-34.551	0.02115	36	1.14951	-1.06013
						37	1.22683	-1.10092
						38	1.29491	-1.13519
						39	1.30258	-1.13625
						40	1.31041	-1.13116

PHASE V ROTOR

MFRIDIONAL AIRFOIL GEOMETRY - STREAMLINE 8

NB 20

MEANLINE DATA

PT	PCT X	X	Y	B+M	T (M)	PT	X S	Y S	XP	YP
1	0.	-1.57429	1.44220	-47.650	0.01927	1	-1.57429	-1.44220	-1.57429	1.44220
2	0.02500	-1.50067	1.36107	-47.899	0.03226	2	-1.57763	1.43486	-1.56661	1.44484
3	0.05000	-1.42704	1.27928	-48.104	0.04528	3	-1.57536	1.42822	-1.56027	1.44196
4	0.07500	-1.35342	1.19702	-48.219	0.05825	4	-1.51264	1.35026	-1.48870	1.37189
5	0.10000	-1.27979	1.11461	-48.202	0.07111	5	-1.44390	1.26416	-1.41019	1.29440
6	0.12500	-1.20617	1.03246	-48.035	0.08374	6	-1.37514	1.17761	-1.33170	1.21643
7	0.15000	-1.13255	0.95102	-47.715	0.09607	7	-1.30630	1.09091	-1.25329	1.13830
8	0.17500	-1.05892	0.87067	-47.262	0.10802	8	-1.23673	1.00446	-1.17504	1.06046
9	0.20000	-0.98530	0.79175	-46.702	0.11952	9	-1.16808	0.91870	-1.09701	0.98334
10	0.23000	-0.89695	0.69924	-45.910	0.13265	10	-1.09859	0.83402	-1.01925	0.90733
11	0.26000	-0.80860	0.60944	-45.004	0.14497	11	-1.02879	0.75076	-0.94180	0.83273
12	0.29000	-0.72025	0.52258	-43.998	0.15642	12	-0.94458	0.65309	-0.84931	0.74538
13	0.32000	-0.63190	0.43886	-42.911	0.16693	13	-0.85985	0.55818	-0.75734	0.66069
14	0.35000	-0.54355	0.35832	-41.792	0.17649	14	-0.77457	0.46632	-0.66592	0.57884
15	0.38000	-0.45520	0.28085	-40.704	0.18506	15	-0.68873	0.37773	-0.57507	0.49999
16	0.41000	-0.36685	0.20619	-39.709	0.19264	16	-0.60236	0.29252	-0.48474	0.42411
17	0.44000	-0.27850	0.13395	-38.859	0.19923	17	-0.51554	0.21070	-0.39485	0.35100
18	0.47000	-0.19015	0.063370	-38.132	0.20480	18	-0.42839	0.13210	-0.30531	0.28029
19	0.50000	-0.10180	-0.00484	-37.488	0.20934	19	-0.34100	0.05638	-0.21600	0.21152
20	0.53000	-0.01345	-0.07188	-36.902	0.21282	20	-0.25338	-0.01684	-0.12692	0.14425
21	0.56000	0.07490	-0.13756	-36.357	0.21520	21	-0.16550	-0.08789	-0.03810	0.07822
22	0.59000	0.16325	-0.20198	-35.845	0.21646	22	-0.07734	-0.15697	0.05044	0.01321
23	0.62000	0.25160	-0.26524	-35.361	0.21658	23	0.01111	-0.22421	0.13869	-0.05091
24	0.65000	0.33995	-0.32739	-34.896	0.21537	24	0.09987	-0.28972	0.22663	-0.11425
25	0.68000	0.42830	-0.38850	-34.444	0.21261	25	0.18893	-0.35355	0.31427	-0.17692
26	0.71000	0.51665	-0.44859	-33.998	0.20803	26	0.27834	-0.41572	-0.23907	0.4156
27	0.74000	0.60500	-0.50768	-33.552	0.20136	27	0.36817	-0.47617	0.48843	-0.30083
28	0.77000	0.69335	-0.56579	-33.113	0.19236	28	0.45849	-0.53483	0.57481	-0.36236
29	0.80000	0.78170	-0.62294	-32.684	0.18079	29	0.54935	-0.59158	0.66064	-0.42378
30	0.83000	0.87005	-0.67916	-32.257	0.16639	30	0.64081	-0.64634	0.74589	-0.48523
31	0.86000	0.95840	-0.73445	-31.816	0.14891	31	0.73288	-0.69902	0.83051	-0.54685
32	0.89000	1.04675	-0.78876	-31.331	0.12825	32	0.82565	-0.74952	0.9445	-0.60880
33	0.92000	1.13510	-0.84197	-30.774	0.10424	33	0.91915	-0.79772	0.99765	-0.67118
34	0.95000	1.22345	-0.89394	-30.149	0.07619	34	1.01340	-0.84353	1.08009	-0.73398
35	0.97500	1.29707	-0.93623	-29.589	0.04952	35	1.10843	-0.88675	1.16176	-0.79719
36	1.00000	1.37070	-0.97754	-29.006	0.02116	36	1.20431	-0.92688	1.24258	-0.86100
						37	1.28485	-0.95776	1.30930	-0.91470
						38	1.35556	-0.98328	1.36759	-0.96168
						39	1.36335	-0.98346	1.37189	-0.96838
						40	1.37070	-0.97754	1.37070	-0.97754

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 9

MEANLINE DATA				SURFACE COORDINATES			
PT	PCT X	X	Y	B+M	T (M)	XS	YS
1	0.	-1.62947	1.30540	-46.064	0.01882	-1.62947	1.30540
2	0.02500	-1.55272	1.22563	-46.140	0.03462	-1.63257	1.29808
3	0.05000	-1.47597	1.14570	-46.175	0.05039	-1.63022	1.29165
4	0.07500	-1.39921	1.06578	-46.122	0.06604	-1.56520	1.21364
5	0.10000	-1.32246	0.98618	-45.938	0.08150	-1.49414	1.12825
6	0.12500	-1.24571	0.90730	-45.598	0.09663	-1.42302	1.04289
7	0.15000	-1.16895	0.82959	-45.084	0.11134	-1.35174	0.95784
8	0.17500	-1.09220	0.75349	-44.396	0.12554	-1.28023	0.87350
9	0.20000	-1.01545	0.67942	-43.538	0.13914	-1.20838	0.79028
10	0.23000	-0.92334	0.59369	-42.317	0.15456	-1.13611	0.70864
11	0.26000	-0.83124	0.51180	-40.946	0.16891	-1.06337	0.62899
12	0.29000	-0.73913	0.43383	-39.561	0.18214	-9.97537	0.53655
13	0.32000	-0.64703	0.35945	-38.301	0.19424	-8.88659	0.44801
14	0.35000	-0.55493	0.28818	-37.189	0.20521	-7.9714	0.36361
15	0.38000	-0.46282	0.21955	-36.204	0.21503	-7.0723	0.28324
16	0.41000	-0.37072	0.15325	-35.299	0.22366	-6.1695	0.20644
17	0.44000	-0.27861	0.08909	-34.426	0.23109	-5.2633	0.13280
18	0.47000	-0.18651	0.02695	-33.595	0.23727	-4.35354	0.06198
19	0.50000	-0.09440	-0.03333	-32.823	0.24217	-3.4394	0.00621
20	0.53000	-0.00230	-0.09192	-32.112	0.24575	-2.5215	-0.07187
21	0.56000	0.08980	-0.14898	-31.456	0.24797	-1.6004	-0.13508
22	0.59000	0.18191	-0.20464	-30.835	0.24880	-0.6762	-0.19600
23	0.62000	0.27401	-0.25896	-30.224	0.24815	-0.2510	-0.2545
24	0.65000	0.36612	-0.31196	-29.615	0.24584	0.11815	-0.31146
25	0.68000	0.45822	-0.36367	-29.000	0.24161	0.21155	-0.36617
26	0.71000	0.55032	-0.41407	-28.376	0.23524	0.30537	-0.41883
27	0.74000	0.64243	-0.46317	-27.740	0.22651	0.39965	-0.46933
28	0.77000	0.73453	-0.51095	-27.097	0.21521	0.49442	-0.51756
29	0.80000	0.82664	-0.55742	-26.453	0.20114	0.58971	-0.56341
30	0.83000	0.91874	-0.60261	-25.812	0.18404	0.68552	-0.60674
31	0.86000	1.01084	-0.64653	-25.180	0.16370	0.78184	-0.64746
32	0.89000	1.10295	-0.68922	-24.560	0.14007	0.87867	-0.68545
33	0.92000	1.19505	-0.73073	-23.956	0.11301	0.97602	-0.72060
34	0.95000	1.28716	-0.77108	-23.362	0.08178	1.07384	-0.75292
35	0.97500	1.36391	-0.80384	-22.871	0.05232	1.17211	-0.78236
36	1.00000	1.44066	-0.83583	-22.380	0.02111	1.27094	-0.80861

CHORD 3 74308

CAMR 23.684

STAGGER -34.893

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 10

MEANLINE DATA				SURFACE COORDINATES			
PT	P1	P2	Y	T (M)	XS	YS	XP
1	0	1	63192	-44.303	0.22118	-1.63192	1.12422
2	0.02500	-1.55257	1	04717	-44.009	0.03964	-1.11579
3	0.05000	-1.47322	0	27095	-43.682	0.05794	-1.63237
4	0.07500	-1.39387	0	89567	-43.288	0.07601	-1.61636
5	0.10000	-1.31452	0	82154	-42.795	0.09375	-1.56334
6	0.12500	-1.23517	0	74883	-42.185	0.11106	-1.49323
7	0.15000	-1.15582	0	67782	-41.444	0.12783	-1.34637
8	0.17500	-1.07648	0	60879	-40.569	0.14395	-1.27246
9	0.20000	-0.99713	0	54202	-39.567	0.15935	-1.19788
10	0.23000	-0.90191	0	46517	-38.218	0.17676	-1.19813
11	0.26000	-0.80669	0	39212	-36.755	0.19293	-0.62991
12	0.29000	-0.71147	0	32292	-35.265	0.20782	-0.72573
13	0.32000	-0.61625	0	25736	-33.841	0.22138	-0.66317
14	0.35000	-0.52103	0	19512	-32.509	0.23358	-0.60344
15	0.38000	-0.42581	0	13589	-31.271	0.24437	-0.55412
16	0.41000	-0.33059	0	07938	-30.114	0.25373	-0.48061
17	0.44000	-0.23537	0	02537	-29.021	0.26164	-0.42472
18	0.47000	-0.14015	0	02632	-27.970	0.26804	-0.39574
19	0.50000	-0.04493	0	07579	-26.943	0.27288	-0.39574
20	0.53000	0.05029	-0	12313	-25.930	0.27613	-0.34641
21	0.56000	0.14550	-0	16840	-24.927	0.27773	-0.34930
22	0.59000	0.24072	-0	21166	-23.943	0.27763	-0.29368
23	0.62000	0.33594	-0	25299	-22.986	0.27571	-0.24033
24	0.65000	0.43116	-0	29246	-22.044	0.27181	-0.19013
25	0.68000	0.52638	-0	33011	-21.103	0.26573	-0.14647
26	0.71000	0.62160	-0	36596	-20.146	0.25729	-0.09663
27	0.74000	0.71682	-0	39997	-19.170	0.24633	-0.09663
28	0.77000	0.81204	-0	43218	-18.213	0.23270	-0.03036
29	0.80000	0.90726	-0	46268	-17.317	0.21624	-0.02943
30	0.83000	1	00248	-0.49161	-16.500	0.19674	-0.02943
31	0.86000	1	09770	-0.51915	-15.769	0.17404	-0.02943
32	0.89000	1	19292	-0.54543	-15.107	0.14807	-0.02943
33	0.92000	1	28813	-0.57059	-14.493	0.11870	-0.02943
34	0.95000	1	38335	-0.59468	-13.912	0.08523	-0.02943
35	0.97500	1	46270	-0.61399	-13.440	0.05399	-0.02943
36	1.00000	1	54205	-0.63261	-12.974	0.02106	-0.02943

CHORD 3.62775 CAMBER 31 329 STAGGER -28.965

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 11

MEANLINE DATA				SURFACE COORDINATES						
PT	PCT X	X	Y	B,M	T (M)	PT	XS	YS	XP	YP
1	0.	-1.62430	0.91073	-41.252	0.02620	1	-1.62430	0.91073	-1.62430	0.91073
2	0.02500	-1.54284	0.83981	-40.836	0.04522	2	-1.62779	0.90005	-1.61435	0.91558
3	0.05000	-1.46138	0.76997	-40.367	0.06410	3	-1.62387	0.89142	-1.60511	0.91285
4	0.07500	-1.37993	0.70139	-39.793	0.08273	4	-1.55763	0.82270	-1.52806	0.85691
5	0.10000	-1.29847	0.63438	-39.061	0.10103	5	-1.48214	0.74555	-1.44062	0.79439
6	0.12500	-1.21701	0.56930	-38.156	0.11886	6	-1.40640	0.66961	-1.35245	0.73318
7	0.15000	-1.13555	0.50650	-37.078	0.13613	7	-1.33030	0.59516	-1.26664	0.67361
8	0.17500	-1.05410	0.44625	-35.880	0.15275	8	-1.25373	0.52257	-1.18029	0.61603
9	0.20000	-0.97264	0.38867	-34.625	0.16868	9	-1.17659	0.45220	-1.09452	0.56080
10	0.23000	-0.87489	0.32308	-33.086	0.18682	10	-1.09886	0.38437	-1.00933	0.50813
11	0.26000	-0.77714	0.26125	-31.546	0.20562	11	-1.02056	0.31926	-0.92472	0.45807
12	0.29000	-0.67939	0.20303	-29.999	0.21961	12	-0.92588	0.24482	-0.82390	0.40135
13	0.32000	-0.58164	0.14835	-28.438	0.23414	13	-0.83046	0.17440	-0.72382	0.34809
14	0.35000	-0.48389	0.09713	-26.879	0.24738	14	-0.73429	0.10794	-0.62449	0.29813
15	0.38000	-0.38614	0.04921	-25.349	0.25929	15	-0.63739	0.04541	-0.52589	0.25130
16	0.41000	-0.28840	0.00445	-23.874	0.26983	16	-0.53981	0.01320	-0.42797	0.20745
17	0.44000	-0.19065	-0.03739	-22.475	0.27895	17	-0.44165	0.06795	-0.33064	0.16638
18	0.47000	-0.09290	-0.07649	-21.139	0.28661	18	-0.34300	0.11893	-0.23379	0.12782
19	0.50000	0.00485	-0.11303	-19.851	0.29278	19	-0.24396	0.16627	-0.13733	0.09149
20	0.53000	0.10260	-0.14711	-18.598	0.29741	20	-0.14458	0.21016	-0.04122	0.05717
21	0.56000	0.20035	-0.17884	-17.371	0.30045	21	-0.04486	0.25072	0.05456	0.02467
22	0.59000	0.29810	-0.20829	-16.165	0.30187	22	0.05518	0.28805	0.15003	-0.00617
23	0.62000	0.39585	-0.23553	-14.977	0.30159	23	0.15550	0.32221	0.24520	-0.03546
24	0.65000	0.49360	-0.26061	-13.810	0.29935	24	0.25608	0.35326	0.34012	-0.06332
25	0.68000	0.59135	-0.28361	-12.670	0.29486	25	0.35688	0.38120	0.43482	-0.08986
26	0.71000	0.68910	-0.30458	-11.561	0.28778	26	0.45787	0.40596	0.52933	-0.11526
27	0.74000	0.78684	-0.32362	-10.476	0.27777	27	0.55901	0.42144	0.62368	-0.13977
28	0.77000	0.88459	-0.34073	-9.380	0.26453	28	0.66026	0.44555	0.71793	-0.16362
29	0.80000	0.98234	-0.35589	-8.244	0.24774	29	0.76159	0.46019	0.81210	-0.18705
30	0.83000	1.08000	-0.36903	-7.059	0.22705	30	0.86304	0.47123	0.90515	-0.21023
31	0.86000	1.17784	-0.38008	-5.830	0.20215	31	0.96458	0.47848	1.00010	-0.23330
32	0.89000	1.27559	-0.38899	-4.584	0.17292	32	1.06614	0.48170	1.09404	-0.25637
33	0.92000	1.37334	-0.39576	-3.342	0.13907	33	1.16757	0.48063	1.18811	-0.27953
34	0.95000	1.47109	-0.40040	-2.097	0.09947	34	1.26868	0.47517	1.28250	-0.30280
35	0.97500	1.55254	-0.40264	-1.047	0.06172	35	1.36928	0.46517	1.37739	-0.32634
36	1.00000	1.63400	-0.40338	0.009	0.02158	36	1.46927	0.45010	1.47291	-0.35070
						37	1.55198	0.43350	1.55311	-0.37178
						38	1.62349	0.41678	1.62357	-0.38996
						39	1.63036	0.41271	1.63066	-0.39435
						40	1.63400	0.40338	1.63400	-0.40338

PHASE V ROTOR

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 12

MEANLINE DATA				SURFACE COORDINATES			
PT	PCT X	X	Y	B'M	T (M)	XS	YS
1	0	-1.64355	0.79816	-37.692	0.03474	-1.64855	0.79816
2	0	-1.56604	0.73513	-37.048	0.05662	-1.65236	0.78358
3	0	-1.48352	0.67360	-36.769	0.07830	-1.67240	0.77217
4	0	-1.40101	0.61363	-35.644	0.09964	-1.58309	0.71254
5	0	-1.31850	0.55529	-34.867	0.12052	-1.50674	0.64218
6	0	-1.25000	0.23598	-34.029	0.14084	-1.43004	0.57314
7	0	-1.15000	0.15347	-33.123	0.16049	-1.35294	0.50585
8	0	-1.07095	0.07095	-32.145	0.17938	-1.27539	0.44032
9	0	-0.98844	0.09884	-31.097	0.19739	-1.19732	0.37668
10	0	-0.88942	0.08894	-29.752	0.21773	-1.11867	0.31510
11	0	-0.79041	0.07904	-28.324	0.23655	-1.03941	0.25571
12	0	-0.69139	0.17533	-26.833	0.25372	-0.94345	0.18753
13	0	-0.59237	0.12688	-25.305	0.26911	-0.84652	0.12294
14	0	-0.49336	0.08168	-23.762	0.28262	-0.74865	0.06213
15	0	-0.39434	0.03966	-22.233	0.29421	-0.64988	0.00524
16	0	-0.29532	0.00068	-20.747	0.30376	-0.55030	-0.04765
17	0	-0.19630	-0.03542	-19.329	0.31120	-0.45000	-0.09651
18	0	-0.09729	-0.06885	-17.991	0.31644	-0.34912	-0.14135
19	0	0.50000	0.00173	-0.09980	-16.736	0.31938	-0.24781
20	0	0.53000	0.10075	-0.12845	-15.554	0.31996	-0.14616
21	0	0.56000	0.19976	-0.15496	-14.423	0.31811	-0.14616
22	0	0.59000	0.29878	-0.17940	-13.304	0.31389	-0.14616
23	0	0.62000	0.39780	-0.20178	-12.166	0.30736	-0.14616
24	0	0.65000	0.49681	-0.22208	-10.994	0.29859	-0.14616
25	0	0.68000	0.59583	-0.24023	-9.781	0.28761	-0.14616
26	0	0.71000	0.69485	-0.25619	-8.513	0.27448	-0.14616
27	0	0.74000	0.79386	-0.26184	-7.172	0.25922	-0.14616
28	0	0.77000	0.89288	-0.28104	-5.714	0.24190	-0.14616
29	0	0.80000	0.99190	-0.22208	-4.106	0.22257	-0.14616
30	0	0.83000	1.09091	-0.29518	-2.350	0.20125	-0.14616
31	0	0.86000	1.18993	-0.29762	-0.462	0.17800	-0.14616
32	0	0.89000	1.28895	-0.29672	1.520	0.15288	-0.14616
33	0	0.92000	1.38796	-0.29233	3.563	0.12587	-0.14616
34	0	0.95000	1.48698	-0.28434	5.677	0.09660	-0.14616
35	0	0.97500	1.56949	-0.27482	7.496	0.07038	-0.14616
36	1	1.00000	1.65201	-0.26261	9.335	0.04323	-0.14616

MEANLINE DATA						SURFACE COORDINATES					
PT	PCT	X	Y	B+M	T(M)	PT	X S	Y S	XP	YP	
1	0.	-1.6831	0.69983	-32.270	0.05298	1	-1.68831	0.69983	-1.68831	0.69983	
2	0.02500	-1.60450	0.64714	-32.037	0.07278	2	-1.69201	0.6736	-1.66984	0.71281	
3	0.05000	-1.52069	0.59498	-31.751	0.09261	3	-1.68154	0.66113	-1.65050	0.71041	
4	0.07500	-1.43688	0.54346	-31.389	0.11236	4	-1.62381	0.61630	-1.58520	0.67799	
5	0.10000	-1.35307	0.49276	-30.934	0.13187	5	-1.54506	0.55560	-1.49632	0.63435	
6	0.12500	-1.26926	0.44307	-30.371	0.15100	6	-1.46614	0.49550	-1.40762	0.59142	
7	0.15000	-1.18545	0.39461	-29.684	0.16965	7	-1.38696	0.43621	-1.31918	0.54932	
8	0.17500	-1.10163	0.34761	-28.858	0.18769	8	-1.30743	0.37793	-1.23108	0.50822	
9	0.20000	-1.01782	0.30232	-27.881	0.20501	9	-1.22745	0.32092	-1.14344	0.46830	
10	0.23000	-0.91725	0.25060	-26.517	0.22474	10	-1.14693	0.26542	-1.05634	0.42990	
11	0.26000	-0.81668	0.20207	-24.975	0.24320	11	-1.06576	0.21172	-0.96989	0.39293	
12	0.29000	-0.71610	0.15696	-23.323	0.26024	12	-0.96742	0.15005	-0.86708	0.35115	
13	0.32000	-0.61553	0.11534	-21.637	0.27573	13	-0.86802	0.09184	-0.76533	0.31230	
14	0.35000	-0.51496	0.07711	-19.994	0.28962	14	-0.76762	0.03747	-0.66459	0.27644	
15	0.38000	-0.41438	0.04205	-18.469	0.30182	15	-0.66636	-0.01282	-0.56469	0.24349	
16	0.41000	-0.31381	0.00980	-17.124	0.31225	16	-0.56447	-0.05397	-0.46544	0.21319	
17	0.44000	-0.21323	-0.02005	-15.958	0.32082	17	-0.46219	-0.10109	-0.36657	0.18519	
18	0.47000	-0.11266	-0.04780	-14.899	0.32745	18	-0.35978	-0.13941	-0.26784	0.15900	
19	0.50000	-0.01209	-0.07360	-13.881	0.33202	19	-0.25734	-0.17428	-0.16913	0.13418	
20	0.53000	0.0849	-0.09750	-12.850	0.33445	20	-0.15476	-0.20602	-0.07057	0.11042	
21	0.56000	0.18906	-0.11945	-11.756	0.33465	21	-0.05191	-0.23476	-0.02774	0.08756	
22	0.59000	0.28963	-0.13930	-10.564	0.33260	22	0.05130	-0.26054	0.12568	0.06553	
23	0.62000	0.39021	-0.15685	-9.210	0.32832	23	0.15497	-0.28327	0.22315	0.04436	
24	0.65000	0.49078	-0.17183	-7.710	0.32188	24	0.25918	-0.30279	0.32009	0.02418	
25	0.68000	0.59135	-0.18399	-6.041	0.31336	25	0.36393	-0.31889	0.41648	0.00519	
26	0.71000	0.69193	-0.19302	-4.200	0.30282	26	0.46919	-0.33132	0.51237	-0.01235	
27	0.74000	0.79250	-0.19866	-2.183	0.29031	27	0.57486	-0.33980	0.60784	-0.02817	
28	0.77000	0.89308	-0.20059	0.008	0.27585	28	0.68084	-0.34403	0.70302	-0.04202	
29	0.80000	0.99365	-0.19853	2.368	0.25947	29	0.78697	-0.34371	0.79803	-0.05361	
30	0.83000	1.09422	-0.19218	4.882	0.24115	30	0.89310	-0.33852	0.89306	-0.06267	
31	0.86000	1.19480	-0.18126	7.523	0.22091	31	0.99901	-0.32816	0.98829	-0.06890	
32	0.89000	1.29537	-0.16554	10.255	0.19883	32	1.10448	-0.31232	1.08396	-0.07204	
33	0.92000	1.39594	-0.14481	13.0	0.17483	33	1.20926	-0.29076	1.18034	-0.07176	
34	0.95000	1.49652	-0.11884	15.911	0.14840	34	1.31307	-0.26337	1.27767	-0.06772	
35	0.97500	1.58033	-0.09301	18.336	0.12437	35	1.41568	-0.22997	1.37620	-0.05965	
36	1.00000	1.66414	-0.06326	20.743	0.09934	36	1.51686	-0.19020	1.47618	-0.04748	

3. PLANE SECTION BLADE COORDINATES

Figure 79 shows the stacked Phase V rotor plane sections. The following tabulation gives the coordinates for these sections. These sections are spaced one half inch apart, beginning at the tip height of 8.5 inches and progressing inward to 2.5 inches. These are the same section locations as given for the baseline rotor in Reference 1. Also included in the tabulation are coordinates for the section meanline, the meanline angle, and the section percent thickness at each point. Plane section chord, camber angle, and stagger angle are also given. These coordinates are intended to represent the blade under hot running conditions and do not include any corrections for blade untwist, meanline deformation, centrifugal growth or thermal growth.

COORD SYSTEM ORIGIN Z -7 03590 R O.
SECTION NO 1 SECTION AA

STAGE 4. ROTOR
NR 20
MU 0. ETA 0
RHO 8 5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	1 09100	57.228	0.01888	1.78987
2	-1 04534	57.658	0.02240	1.71816
3	-0 95280	58.503	0.02965	1.56930
4	-0 85882	59.373	0.03710	1.41288
5	0 76312	60.278	0.04471	1.24818
6	-0 65610	61.280	0.05313	1.05690
7	-0 53753	62.297	0.06226	0.83563
8	-0 41726	63.080	0.07097	0.60229
9	0 29565	63.350	0.07888	0.36099
10	0 17353	63.030	0.08554	0.11884
11	0 05146	62.383	0.09069	-0.11792
12	0 06999	61.678	0.09424	-0.34669
13	0 19042	61.198	0.09619	-0.56773
14	0 30919	60.954	0.09655	-0.78282
15	0 42600	60.856	0.09416	-0.99301
16	0 54061	60.930	0.08672	-1.19923
17	0 65248	61.039	0.07196	-1.40182
18	0 76150	60.773	0.04792	-1.59907
19	0 85033	60.143	0.01977	-1.75626

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	P/C AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00467	-1.09100	1.78987	57.439
2	0 0250	0.00560	-1 04246	1.71361	57.703
3	0 0500	0 00653	-0 99393	1.63610	58.185
4	0 0750	0.00748	-0 94540	1.55716	58.641
5	0 1000	0 00843	-0.89686	1.47683	59.080
6	0 1250	0 00938	-0 84833	1.39510	59.508
7	0 1500	0 01034	-0 79980	1.31197	59.939
8	0 1750	0 01129	-0.75126	1.22737	60.373
9	0 2000	0 01224	-0 70273	1.14122	60.832
10	0 2300	0 01337	-0.64449	1.03568	61.388
11	0 2600	0 01448	-0.58625	0.92771	61.915
12	0 2900	0 01558	-0.52801	0.81744	62.394
13	0 3200	0 01664	-0.46977	0.70508	62.792
14	0 3500	0 01765	-0.41153	0.59101	63.097
15	0 3800	0 01862	-0.35329	0.47571	63.284
16	0 4100	0 01952	-0.29505	0.35979	63.340
17	0 4400	0.02035	-0 23681	0.24392	63.267

PHASE IV ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 1 SECTION AA

STAGE 4 ROTOR

NB 20
 MU O ETA O.
 R10 8.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCI AL	T/C	ALPHA	UPSILON	ZETA
18	0 4100	0.02110	-0.17857	0.12875	63.063
19	0 5000	0.02176	-0.12033	0.01485	62.769
20	0 5300	0.02234	-0.06209	-0.09757	62.448
21	0 5600	0.02282	-0.00385	-0.20840	62.110
22	0 5900	0.02322	0.05439	-0.31767	61.778
23	0 6200	0.02352	0.11263	-0.42547	61.474
24	0 6500	0.02374	0.17087	-0.53212	61.261
25	0 6800	0.02387	0.22911	-0.63802	61.129
26	0 7100	0.02390	0.28735	-0.74341	61.026
27	0 7400	0.02379	0.34559	-0.84841	60.950
28	0 7700	0.02348	0.40383	-0.95317	60.912
29	0 8000	0.02288	0.46207	-1.05784	60.913
30	0 8300	0.02190	0.52031	-1.16264	60.969
31	0 8600	0.02044	0.57855	-1.26778	61.066
32	0 8900	0.01844	0.63679	-1.37333	61.153
33	0 9200	0.01582	0.69503	-1.47914	61.150
34	0 9500	0.01241	0.75327	-1.58433	60.852
35	0 9750	0.00885	0.80180	-1.67070	60.514
36	1 0000	0.00489	0.85033	-1.75626	60.397

CHOPD
4 0427

STAGGER
61.301
CAMBER
-2.958

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00467	-1.09100	1.78987	-1 09100	1.78987
2	0 00467	-1.09528	1.78344	-1 08298	1.79098
3	0 00467	-1.09401	1.77673	-1 07746	1.78663
4	0 00560	-1 05202	1.70756	-1 03290	1.71965
5	0 00653	-1.00515	1.62914	-0 98271	1.64306
6	0 00748	-0.95831	1.54930	-0 93249	1.56503
7	0 00843	-0.91148	1.46807	-0.88224	1.48558
8	0 00938	-0.86467	1.38548	-0.83198	1.40473
9	0 01034	-0.81788	1.30151	-0.78171	1.32244
10	0 01129	-0.77110	1.21609	-0.73142	1.23865
11	0 01224	-0.72433	1.12916	-0.68113	1.15328
12	0 01337	-0.66821	1.02274	-0.62077	1.04861
13	0 01448	-0.61208	0.91393	-0.56042	0.94150
14	0 01558	-0.55591	0.80285	-0.50011	0.83203

PHASE IV ROTOR

•ZPC•

STAGE 4. ROTOR
 COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 1 SECTION AA
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

RI	I/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 01664	-0.49968	0.68970	-0.43986	0 72045
16	0 01765	-0.44335	0.57486	-0.37971	0 .60716
17	0 01862	-0.38691	0.45879	-0.31967	0 .49263
18	0 01952	-0.33031	0.34209	-0.25979	0 .37750
19	0 02035	-0.27355	0.22542	-0.20007	0 .26243
20	0 02110	-0.21659	0.10943	-0.14055	0 .14807
21	0 02176	-0.15944	-0.00528	-0.08122	0 .03497
22	0 02234	-0.10212	-0.11845	-0.02206	-0 .07668
23	0 02282	-0.04463	-0.22998	0.03693	-0 .18682
24	0 02322	0 01303	-0.33987	0.09575	-0 .29548
25	0 02352	0 07085	-0.44818	0 15441	0 .40277
26	0 02374	0 12879	-0.55119	0.21295	-0 .50904
27	0 02387	0 18685	-0 66132	0.27137	-0 .61471
28	0 02390	0 24508	-0.76681	0.32962	-0 .72000
29	0 02379	0 30354	-0.87177	0.38764	-0 .82506
30	0 02348	0 36235	-0.97624	0 44531	-0 .93009
31	0 02288	0 42165	-1.08032	0.50249	-1 .03536
32	0 02190	0 48160	-1.18412	0.55901	-1 .14115
33	0 02044	0 54238	-1.28777	0.61472	-1 .24778
34	0 01844	0 60414	-1.39131	0.66944	-1 .35534
35	0 01582	0 66702	-1.49457	0.72304	-1 .46371
36	0 01241	0 73136	-1.59555	0.77518	-1 .57211
37	0 00885	0 78623	-1.67950	0.81737	-1 .66189
38	0 00489	0 83615	-1.75299	0 85477	-1 .74240
39	0 00489	0 84195	-1 75722	0 85542	-1 .74962
40	0 00489	0 85033	-1 75626	0 85033	-1 .75626
LE RAD	0 00965	CENTER AT ALPHA	-1 .08578	UPSILON	1 .78176
TE RAD	0 01075	CENTER AT ALPHA	0 84502	UPSILON	-1 .74691

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN		Z -7 03590 R O.	STAGE 4	ROTOR	NB 20
SECTION NO	1		SECTION AA	MU 0.	E1A 0
CHORD			STAGGER	RHO 8.5000	
4 0427			61.302	CAMBER	
ARFA 0 283342			SURFACE ARC LENGTH	-2.958	
SECTION C.G.			ALPHA		UPSILON
SURFACE SECTION C G.			-0.01490		-0.16795
BLADE AXIS			-0.01976		-0.15372
STACKING AXIS (RADIAL)			-0.01976		-0.15372
			-0.00220		0.

PLANE IV ROTOR

•7FC•

COORD SYSTEM ORIGIN Z -7.03590 R O
 SECTION NO 2 SECTION BB MU O.
 MEANLINE INPUT DATA RHO 8.0000

PI	ALPHA	ZETA*	THICKNESS	UPSILON
1	1 19582	55.315	0.01973	1.75031
2	1 14421	55.762	0.02381	1.67508
3	1 03969	56.611	0.03223	1.51907
4	0 93344	57.423	0.04092	1.35528
5	0 82548	58.205	0.04975	1.18377
6	0 70486	59.030	0.05947	0.98602
7	0 57131	59.646	0.06978	0.76043
8	0 43599	59.551	0.07927	0.52927
9	-0 29945	58.797	0.08742	0.29990
10	-0 16217	57.653	0.09386	0.07809
11	-0 02487	56.483	0.09847	-0.13396
12	0 11201	55.515	0.10133	-0.33691
13	0 24812	54.793	0.10245	-0.53245
14	0 38314	54.273	0.10163	-0.72205
15	0.51667	53.886	0.09743	-0.90644
16	0.64833	53.599	0.08807	-1.08613
17	0 77783	53.427	0.07207	-1.26121
18	0 90490	53.377	0.04804	-1.43235
19	1 00875	53.356	0.02084	-1.57224

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00495	-1.19582	1.75031	55.315
2	0 0250	0.00604	-1.14070	1.66993	55.790
3	0 0500	0.00715	-1.08559	1.58819	56.228
4	0 0750	0.00827	-1.03047	1.50507	56.682
5	0 1000	0.00940	-0.97536	1.42051	57.117
6	0 1250	0.01053	-0.92025	1.33459	57.519
7	0 1500	0.01167	-0.86513	1.24736	57.912
8	0 1750	0.01279	-0.81002	1.15878	58.307
9	0 2000	0.01391	-0.75490	1.06884	58.691
10	0 2300	0.01523	-0.68877	0.95915	59.129
11	0 2600	0.01653	-0.62263	0.84773	59.460
12	0 2900	0.01777	-0.55649	0.73514	59.653
13	0 3200	0.01896	-0.49035	0.62205	59.678
14	0 3500	0.02007	-0.42422	0.50926	59.519
15	0 3800	0.02110	-0.35808	0.39754	59.205
16	0 4100	0.02202	-0.29194	0.28752	58.746
17	0 4400	0.02285	-0.22581	0.17968	58.208

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.035390 R O.
 SECTION NO 2 SECTION BB MU 0 ETA 0
 NB 20 RHO 8.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	I/C	ALPHA	UPSILON	ZETA*
18	0 4700	0.02356	-0 15967	0.07414	57.640
19	0 5000	0 02417	-0 09353	-0.02909	57.070
20	0 5300	0.02468	-0.02739	-0.13015	56.526
21	0 5600	0.02508	0 03874	-0.22920	56.024
22	0 5900	0.02538	0 10488	-0.32651	55.581
23	0 6200	0.02558	0.17102	-0.42233	55.197
24	0 6500	0.02569	0.23715	-0.51688	54.868
25	0 6800	0.02568	0.30329	-0.61038	54.588
26	0 7100	0.02554	0.36943	-0.70297	54.339
27	0 7400	0.02520	0 43557	-0.79477	54.123
28	0 7700	0.02461	0.50170	-0.88590	53.947
29	0 8000	0.02370	0 56784	-0.97651	53.799
30	0 8300	0.02242	0 63398	-1.06663	53.655
31	0 8600	0.02070	0 70011	-1.15629	53.525
32	0 8900	0.01851	0.76625	-1.24560	53.438
33	0 9200	0.01580	0 83239	-1.33470	53.399
34	0 9500	0.01242	0 89853	-1.42376	53.414
35	0 9750	0.00899	0 95364	-1.49804	53.424
36	1 0100	0.00523	1.00875	-1.57224	53.356

C1:IRD
3 9874
56 435STAGGER
CAMBER
1.959

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	I/C	ALPHA	UPPFR	UPSILON	LOWER ALPHA	UPPSILON
1	0 00495	-1 19582	1.75031	-1 19582	1 75031	1 75031
2	0 00495	-1 20007	1.74343	-1 18745	1 75176	1 75176
3	0 00495	-1 19850	1.73645	-1 18152	1 74738	1 74738
4	0 00604	-1 15067	1.66315	-1 13074	1 67670	1 67670
5	0 00715	-1 09744	1.58027	-1 07374	1 59612	1 59612
6	0 00827	-1 04426	1 49601	-1 01669	1 51412	1 51412
7	0 00940	-0 99110	1 41033	-0 95962	1 43069	1 43069
8	0 01053	-0 93796	1 32331	-0 90253	1 34587	1 34587
9	0 01167	-0 88484	1 23500	-0 84543	1 25971	1 25971
10	0 01279	-0 83172	1 14538	-0 78832	1 17218	1 17218
11	0 01391	-0 77860	1 05443	-0 73121	1 08325	1 08325
12	0 01523	-0 71484	0 94356	-0 66270	0 97473	0 97473
13	0 01653	-0 65101	0 83099	-0 59425	0 86447	0 86447
14	0 01777	-0 58707	0 71724	-0 52591	0 75305	0 75305

COORD SYSTEM ORIGIN Z -7 03590 R O
 SECTION NO 2 SECTION BR
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	STAGE	4	ROTOR	NB	20
		SECTION	0	MU	O.	ETA
				RHO	8	0000
		UPPER	UPPER	UPPER	UPPER	UPPER
		ALPHA	ALPHA	ALPHA	ALPHA	ALPHA
		UPSILON	UPSILON	UPSILON	UPSILON	UPSILON
15	0 01896	-0.52299	0.60296	-0.45772	0.64113	
16	0 02007	-0.45871	0.48896	-0.38973	0.52956	
17	0 02110	-0.39421	0.37601	-0.32195	0.41908	
18	0 02202	-0.32948	0.26474	-0.25441	0.31031	
19	0 02285	-0.26452	0.15568	-0.18709	0.20368	
20	0 02356	-0.19935	0.04899	-0.11998	0.09928	
21	0 02417	-0.13398	-0.05529	-0.05308	-0.00289	
22	0 02468	-0.06844	-0.15728	0.01365	-0.10301	
23	0 02508	-0.00273	-0.25715	0.08021	-0.20126	
24	0 02538	0.06313	-0.35512	0.14663	-0.29791	
25	0 02558	0.12913	-0.45144	0.21290	-0.39321	
26	0 02569	0.19527	-0.54635	0.27903	-0.48741	
27	0 02568	0.26156	-0.64005	0.34503	-0.58071	
28	0 02554	0.32806	-0.73265	0.41080	-0.67328	
29	0 02520	0.39485	-0.82421	0.47628	-0.76532	
30	0 02461	0.46204	-0.91478	0.54137	-0.85703	
31	0 02370	0.52971	-1.00442	0.60597	-0.94860	
32	0 02242	0.59797	-1.09312	0.66998	-1.04014	
33	0 02070	0.66693	-1.18083	0.73330	-1.13176	
34	0 01851	0.73661	-1.26758	0.79589	-1.22362	
35	0 01580	0.80710	-1.35348	0.85768	-1.31592	
36	0 01242	0.87865	-1.43852	0.91841	-1.40900	
37	0 00899	0.93925	-1.50872	0.96803	-1.48736	
38	0 00523	0.99351	-1.57064	1.01161	-1.55718	
39	0 00523	1.00015	-1.57433	1.01323	-1.56461	
40	0 00523	1.00875	-1.57224	1.00875	-1.57224	
LF RAD	0 01010	CENTER AT ALPHA	-1.19007	UPPSILON	1.74200	
TE RAD	0 01132	CENTER AT ALPHA	1.000200	UPPSILON	-1.56316	

PHASE IV ROTOR

ZPC

	STAGE	4	ROTOR	NB	20
COORD SYSTEM ORIGIN	Z	.7.03590	R O.	MU	O
SECTION NO	2		SECTION BB	RHO	8.0000
CHORD			STAGGER	CAMBUR	
3 9874		56 435		1.959	
AREA	0.295909		SURFACE ARC LENGTH	8.00639	
SECTION C.G.			ALPHA	UPPSILON	
SIRFAMSURFACE	SECTION C G.		-0.01777	-0.09947	
PLATE AXIS			-0.02237	-0.08965	
SLACKING AXIS (RADIAL)			-0.02237	-0.08965	
			-0.00220	0	

PLATE IV ROTOR

COORD SYSTEM ORIGIN Z -7 03590 R 0.
SECTION NO 3 SECTION CC

STAGE 4. ROTOR
NB 20
MU 0 ETA 0.
RHO 7.5000

MEANLINE INPUT DATA

RT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.29977	53.704	0.02050	1.71005
2	-1.24306	54.072	0.02552	1.63218
3	-1.12816	54.745	0.03589	1.47150
4	1.01149	55.375	0.04659	1.30444
5	-0.89319	55.999	0.05752	1.13101
6	0.76116	56.629	0.06955	0.93277
7	0.61525	56.803	0.08225	0.70963
8	-0.46739	55.878	0.09381	0.48686
9	0.31820	54.216	0.10356	0.27310
10	-0.16821	52.502	0.11119	0.07147
11	-0.01775	51.044	0.11666	-0.11939
12	0.13277	49.950	0.11997	-0.30176
13	0.28288	49.203	0.12106	-0.47792
14	0.43250	48.656	0.11959	-0.64944
15	0.58129	48.173	0.11389	-0.81693
16	0.72879	47.796	0.10212	-0.98062
17	0.87499	47.535	0.08260	-1.14084
18	1.01950	47.340	0.05380	-1.29808
19	1.13848	47.197	0.02162	-1.42698

MFANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

RT	R/C 1 AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0	0.00516	-1.29977	1.71005
2	0	0.0250	0.00652	-1.23882	1.62631
3	0	0.0500	0.00790	-1.17786	1.54146
4	0	0.0750	0.00929	-1.11690	1.45555
5	0	0.1000	0.01070	-1.05595	1.36856
6	0	0.1250	0.01211	-0.99499	1.28049
7	0	0.1500	0.01353	-0.93404	1.19134
8	0	0.1750	0.01494	-0.87308	1.10113
9	0	0.2000	0.01634	0.81212	1.00986
10	0	0.2300	0.01800	-0.73897	0.89898
11	0	0.2600	0.01962	-0.66583	0.78706
12	0	0.2900	0.02117	0.59268	0.67518
13	0	0.3200	0.02263	-0.51953	0.56448
14	0	0.3500	0.02399	-0.44638	0.45598
15	0	0.3800	0.02522	-0.37324	0.35043
16	0	0.4100	0.02633	-0.30009	0.24807
17	0	0.4400	0.02730	-0.22694	0.14893

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 3 SECTION CC RHO 7.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA
18	0 4700	0.02814	-0.15379	0.05274	52.351
19	0 5000	0.02885	-0.08065	-0.04081	51.614
20	0 5300	0.02944	-0.00750	-0.13204	50.955
21	0 5600	0.02989	0.06565	-0.22130	50.388
22	0 5900	0.03022	0.13880	-0.30893	49.925
23	0 6200	0.03041	0.21194	-0.39526	49.536
24	0 6510	0.03047	0.28509	-0.48049	49.193
25	0 6800	0.03039	0.35824	-0.56475	48.891
26	0 7100	0.03011	0.43139	-0.64817	48.623
27	0 7400	0.02957	0.50453	-0.73086	48.387
28	0 7700	0.02872	0.57768	-0.81290	48.180
29	0 8000	0.02749	0.65083	-0.89438	47.989
30	0 8300	0.02583	0.72398	-0.97531	47.794
31	0 8600	0.02367	0.79712	-1.05571	47.620
32	0 8900	0.02098	0.87027	-1.13569	47.498
33	0 9200	0.01772	0.94342	-1.21539	47.416
34	0 9509	0.01372	1.01657	-1.29490	47.358
35	0.9750	0.00975	1.07752	-1.36103	47.300
36	1 0000	0.00544	1.13848	-1.42698	47.197

CHORD
3 9732STAGGER
52 144
CAMBER
6.507

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	1/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00516	-1 29977	1.71005	-1.29977	1.71005
2	0 00516	-1 30401	1.70276	-1 29144	1.71186
3	0 00516	-1 30220	1.69557	-1.28523	1.70799
4	0 00652	-1 24931	1.61873	-1.22832	1.63390
5	0 00790	1 19063	1.53234	-1.16509	1.55057
6	0 00929	-1 13199	1.44491	-1.10182	1.46619
7	0 01070	-1 07339	1 35642	-1.03851	1.38070
8	0 01211	-1 01481	1 26685	-0.97517	1.29412
9	0 01353	-0 95626	1 17623	-0.91181	1.20645
10	0 01494	-0 89772	1.08457	-0.84844	1.11768
11	0 01634	-0 83917	0.99190	-0.78507	1.02782
12	0 01800	-0 76888	0.87937	-0.70906	0.91859
13	0 01962	-0 69847	0.76575	-0.63318	0.80836
14	0 02117	-0 62784	0.65211	-0.55752	0.69876

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O
 SECTION NO 3 SECTION CC RHO 7.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	STAGE 4 ROTOR			NB 20		
		UPPER	ALPHA	UPSILON	LOWER	ALPHA	UPSILON
15	0.02263	-0.55695	0.53955	-0.48212	0.58942		
16	0.02399	-0.48573	0.42911	-0.40734	0.48286		
17	0.02522	-0.41422	0.32161	-0.33226	0.37926		
18	0.02633	-0.34241	0.21733	-0.25777	0.27880		
19	0.02730	-0.27034	0.11640	-0.18354	0.18145		
20	0.02814	-0.19806	0.01859	-0.10953	0.08689		
21	0.02885	-0.12558	-0.07640	-0.03572	-0.00522		
22	0.02944	-0.05292	-0.16888	0.03792	-0.09521		
23	0.02989	0.01990	-0.25916	0.11139	-0.18344		
24	0.03022	0.09286	-0.34757	0.18473	-0.27029		
25	0.03041	0.16598	-0.43447	0.25790	-0.35606		
26	0.03047	0.23927	-0.52004	0.33091	-0.44093		
27	0.03039	0.31276	-0.60444	0.40372	-0.52506		
28	0.03011	0.38651	-0.68771	0.47627	-0.60864		
29	0.02957	0.46062	-0.76987	0.54845	-0.69185		
30	0.02872	0.53517	-0.85094	0.62020	-0.77486		
31	0.02749	0.61025	0.93093	0.69141	-0.85783		
32	0.02583	0.68597	-1.00978	0.76198	-0.94085		
33	0.02367	0.76239	-1.08740	0.83186	-1.02402		
34	0.02098	0.83954	-1.16385	0.90100	-1.10753		
35	0.01772	0.91750	-1.23921	0.96934	-1.19157		
36	0.01372	0.99652	-1.31336	1.03662	-1.27643		
37	0.00975	1.06329	-1.37416	1.09175	-1.34790		
38	0.00544	1.12247	-1.42714	1.13987	-1.41103		
39	0.00544	1.12978	-1.43013	1.14229	-1.41857		
40	0.00544	1.13648	-1.42698	1.13848	-1.42698		
LF RAD	0.01052	CENTER AT ALPHA	-1.29356	UPSILON	1.70156		
TF RAC	0.01191	CENTER AT ALPHA	1.13039	UPSILON	-1.41824		

PHASE IV ROTOR

•ZPC•

	STAGE	4	ROTOR		NB	20
(0.000) SURF ORIGIN	7	-7.03590	R O	MU	O	ETA O
SECTION NO	3		SSECTION C G		RHO	7.5000
CHORD			STAGGER		CAMBER	
3.9732			52.144		6.507	
AREA O	341989		SURFACE ARC LENGTH			7.98916
SECTION C G			ALPHA		UPSTLON	
SURFAMSURFACE SECTION C G.			-0.01298		-0.06823	
BLADF AXIS			-0.02284		-0.05934	
STACKING AXIS (RADIAL)			-0.02284		-0.05934	
			-0.00220		0	

PHASE IV ROTOR

•ZPC•

CORD SYSTEM ORIGIN 2 -7 03590 R O.
 SECTION NO 4 SECTION DD

RHO 7 0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.38977	52.277	.02080	1.64184
2	-1.32847	52.588	.02735	1.56212
3	1.20452	53.201	.04104	1.39838
4	1.07890	53.820	.05536	1.22869
5	0.95175	54.323	.07008	1.05322
6	0.81016	54.471	.08631	0.85511
7	0.65366	53.798	.0.10330	0.63796
8	-0.49548	52.014	0.11855	0.42803
9	-0.33582	49.813	0.13135	0.23157
10	0.15118	48.054	0.14142	0.04739
11	0.01389	46.675	0.14862	-0.12765
12	0.14763	45.500	0.15280	-0.29553
13	0.30939	44.461	0.15387	-0.45710
14	0.47104	43.552	0.15096	0.61317
15	0.63226	42.784	0.14213	-0.76439
16	0.79307	42.135	0.12555	-0.91140
17	0.95320	41.587	0.09952	-1.05481
18	1.1256	41.122	0.06241	-1.19491
19	1.24453	40.782	0.02179	-1.30952

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	FC*	AI	T/C	ALPHA	UPSILON	ZETA*
1	0	0	0.00526	-1.38977	1.64184	52.277
2	0	0.0250	0.00704	-1.32391	1.55616	52.609
3	0	0.0500	0.00886	-1.25805	1.46953	52.912
4	0	0.0750	0.01073	-1.19220	1.38190	53.235
5	0	0.1000	0.01262	-1.12634	1.29322	53.562
6	0	0.1250	0.01453	-1.06048	1.20349	53.883
7	0	0.1500	0.01646	0.99462	1.11276	54.162
8	0	0.1750	0.01839	0.92877	1.02118	54.383
9	0	0.2000	0.02030	-0.86291	0.92903	54.487
10	0	0.2300	0.02256	-0.78388	0.81833	54.433
11	0	0.2600	0.02475	-0.70485	0.70833	54.130
12	0	0.2900	0.02683	-0.62582	0.60009	53.554
13	0	0.3200	0.02878	-0.54679	0.49452	52.714
14	0	0.3500	0.03058	-0.46776	0.39280	51.613
15	0	0.3800	0.03221	-0.38874	0.29500	50.513
16	0	0.4100	0.03366	-0.30971	0.20081	49.506
17	0	0.4400	0.03495	-0.23068	0.10974	48.610

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R 0.
 SECTION NO 4 SECTION DD
 RHO 7.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA+
18	0 4700	C.03606	-0 15165	0.02131	47.836
19	0 5000	0.03699	-0 07262	-0.06490	47.149
20	0 5300	0.03774	0 00641	-0.14917	46.538
21	0 5600	0.03831	0 08544	-0.23172	45.958
22	0 5900	0.03869	0 16447	-0.31263	45.392
23	0 6200	0.03889	0 24350	-0.39200	44.860
24	0 6500	0.03888	0 32252	-0.46997	44.374
25	0 6800	0.03863	0 40155	-0.54668	43.926
26	0 7100	0.03808	0 48058	-0 62224	43.513
27	0 7400	0 03715	0 55961	-0 69676	43.122
28	0 7700	0.03580	0 63864	-0.77028	42.745
29	0 8000	0.03398	0 71767	-0 84288	42.404
30	0 8300	0 03161	0 79670	-0 91467	42.113
31	0 8600	0.02866	0 87573	-0.98578	41.841
32	0 8900	0.02508	0 95476	-1.05619	41.558
33	0 9200	0.02084	1 03378	-1.12593	41.306
34	0 9500	0.01576	1 11281	-1.19514	41.125
35	0 9750	0.01081	1 17867	1.25250	40.979
36	1 0000	0 00551	1.24453	-1 30952	40.782

CHORD 3.9560
 STAGGER 48.249
 CANTER 11.495

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER UPSILON	UPSILON
1	0 01526	-1 38977	1 64184	-1 38977	1.64184
2	0 01526	-1 39390	1 63431	-1 38135	1.64392
3	0 01526	-1 39191	1 62705	-1 37492	1.64017
4	0 01704	-1 33497	1 54771	-1 31285	1.56461
5	0 01886	-1 27204	1 45895	-1 24407	1.48010
6	0 01073	-1 20919	1 36920	-1 17520	1.39460
7	0 01262	-1 14642	1 27840	-1 10626	1.30805
8	0 01453	-1 03370	1 18655	-1 03726	1.22043
9	0 01646	-1 02101	1 09370	-0 96823	1.13182
10	0 01839	-0 95833	1 00000	-0 89920	1.04236
11	0 02030	-0 89560	0 90571	-0 83022	0 95236
12	C 02256	-0 82018	0 79237	-0 74758	0 84429
13	O 02475	-0 74452	0 67965	0 66518	0 73702
14	O 02683	-0 66851	0 56857	-0 58313	0 63162

PHASE IV ROTOR

•ZPC•

STAGE 4 ROTOR
 COORD SYSTEM ORIGIN Z -7 03590 R O MU O.
 SECTION NO 4 SECTION DD MU O.
 RHO 7.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

R1	1/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 02878	-0 59209	0 46013	-0 50150	0 52910
16	0 03058	-0 51517	0 35524	-0 42035	0 43036
17	0 03221	-0 43790	0 25449	-0 33957	0 33551
18	0 03366	-0 36035	0 15757	-0 25907	0 24405
19	0 03495	-0 28254	0 06403	-0 17881	0 15545
20	0 03606	-0 20452	-0 02657	-0 09878	0 06919
21	0 03699	-0 12626	-0 11466	-0 01897	-0 01514
22	0 03774	0 04778	-0 20052	0 06060	-0 09782
23	0 03831	0 03097	-0 28439	0 13991	-0 17904
24	0 03869	0 10998	-0 36637	0 21895	-0 25888
25	0 03889	0 18924	-0 44652	0 29775	-0 33747
26	0 03888	0 26874	-0 52494	0 37631	-0 41499
27	0 03863	0 34855	-0 60171	0 45456	-0 49164
28	0 03808	0 42873	-0 67686	0 53244	-0 56762
29	0 03715	0 50938	-0 75039	0 60984	-0 64312
30	0 03580	0 59057	-0 82229	0 68671	-0 71828
31	0 03398	0 67235	-0 89250	0 76299	-0 79325
32	0 03161	0 75476	-0 96106	0 83863	-0 86828
33	0 02866	0 83792	-1 02800	0 91354	-0 94355
34	0 02508	0 92185	-1 09331	0 98767	-1 01907
35	0 02084	1 00658	-1 15689	1 06099	-1 09496
36	0 01576	1 09231	-1 21862	1 13331	-1 17166
37	0 01081	1 16464	-1 26865	1 19270	-1 23635
38	0 00551	1 22835	-1 31170	1 24433	-1 29321
39	0 00551	1 23608	-1 31375	1 24749	-1 30061
40	0 00551	1 24453	-1 30952	1 24453	-1 30952
41 F RAD	0 01074	CENTER AT ALPHA	-1 38320	UPSILON	1 63334
41 F RAD	0 01231	CENTER AT ALPHA	1 23521	UPSILON	-1 30147

PHASE IV ROTOR

•ZPC•

	STAGE	4.	ROTOR		NB	20
COORD SYSTEM ORIGIN	Z	-7.03590	R O	MU	O.	ETA 0
SECTION NO	4		SECTION DD		RHO	7 0000
CHORD			STAGGER		CAMBER	
3 9560			48 249		11 495	
AREA	O 421805		SURFACE ARC LENGTH			7 . 97273
SECTION C G			ALPHA		UPSILON	
STREAM SURFACE SECTION C.G.			-O.01015		-C 06977	
BLADE AXIS			-O.03057		-O. 25563	
SLACKING AXIS (RADIAL)			-O.03057		-O. 05563	
			-O.00220		O.	

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 5 SECTION EE
 MEANLINE INPUT DATA

PI	ALPHA	ZETA	THICKNESS	UPSILON
1	-1 46674	51.224	0.02071	1.55182
2	1 40169	51.558	0.02964	1.47024
3	-1 27038	52.150	0.04834	1.30280
4	1 13742	52.516	0.06786	1.13037
5	1 00295	52.504	0.08773	0.95476
6	0 .85328	51.922	0.10931	0.76130
7	-0 68807	50.494	0.13150	0.55527
8	0 52115	48.191	0.15126	0.36050
9	-0 35290	45.688	0.16787	0.18062
10	0 18362	43.720	0.18104	0.01342
11	0 01355	42.070	0.19065	-0.14443
12	0 15706	40.560	0.19641	-0.29431
13	0 32817	39.242	0.19796	-0.43726
14	0 49962	38.091	0.19386	-0.57440
15	0 67124	37.045	0.18192	-0.70651
16	0 84292	36.042	0.15992	-0.83402
17	1 01468	35.033	0.12568	-0.95695
18	1 18656	33.976	0.07674	-1.07538
19	1 32985	33.042	0.02275	-1.17073

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00531	1.46674	1.55182	51.224
2	0 0250	0.00777	-1.39683	1.46410	51.633
3	0 0500	0.01030	-1.32691	1.37529	51.938
4	0 0750	0.01288	-1.25700	1.28555	52.208
5	0 1000	0.01551	-1.18708	1.19503	52.417
6	0 1250	0.01815	-1.11717	1.10395	52.552
7	0 1500	0.02081	1.04726	1.01259	52.571
8	0 1750	0.02344	0.97734	0.92139	52.458
9	0 2000	0.02604	-0.90743	0.83078	52.210
10	0 2300	0.02907	-0.82353	0.72346	51.725
11	0 2600	0.03198	-0.73963	0.61839	51.022
12	0 2900	0.03473	-0.65573	0.51634	50.088
13	0 3200	0.03730	-0.57183	0.41796	48.962
14	0 3500	0.03966	-0.48794	0.32372	47.662
15	0 3800	0.04181	0.40404	0.23366	46.403
16	0 4100	0.04373	-0.32014	0.14732	45.259
17	0 4400	0.04543	-0.223624	0.06417	44.248

PHASE IV Rotor

•ZPC•

COORD SYSTEM ORIGIN Z -7 03590 R O.
 SECTION NO 5 SECTION EE
 RHO 6.5000

MFANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCI AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0.04691	-0.15235	-0.01630	43.380
19	0 5000	0.04816	-0.06845	-0.09446	42.569
20	0 5300	0.04917	0.01545	-0.17048	41.792
21	0 5600	0.04994	0.09935	-0.24449	41.048
22	0 5900	0.05046	0.18324	-0.31663	40.340
23	0 6200	0.05072	0.26714	-0.38704	39.680
24	0 6500	0.05067	0.35104	0.45589	39.072
25	0 6800	0.05027	0.43494	-0.52331	38.508
26	0 7100	0.04944	0.51884	-0.58943	37.982
27	0 7400	0.04811	0.60273	-0.65435	37.482
28	0 7700	0.04622	0.68663	-0.71813	37.003
29	0 8000	0.04371	0.77053	-0.78081	36.525
30	0 8300	0.04049	0.85443	-0.84240	36.036
31	0 8600	0.03651	0.93832	-0.90288	35.535
32	0 8900	0.03174	1.02222	-0.96223	35.019
33	0 9200	0.02610	1.10612	-1.02048	34.528
34	0 9500	0.01936	1.19002	-1.07772	34.094
35	0 9750	0.01282	1.25993	-1.12469	33.658
36	1 0000	0.00583	1.32985	-1.17073	33.042

CHORD 3 3030 STAGGER 44 231 CAMBER 18.182

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00531	-1 46674	1.55182	-1.46674	1.55182
2	0 00531	-1 47076	1.54423	-1.45836	1.55407
3	0 00531	-1 46870	1.53700	-1.45185	1.55049
4	0 01717	-1 40871	1.45469	-1.38495	1.47350
5	0 01030	-1 34273	1.36290	-1.31110	1.38767
6	0 01288	-1 27687	1.27015	-1.23713	1.30096
7	0 01551	-1 21107	1.17658	-1.16310	1.21349
8	0 01815	-1 14530	1.08240	-1.08904	1.12549
9	0 02081	-1 07950	0.98791	-1.01501	1.03727
10	0 02344	-1 01361	0.89352	-0.94107	0.94926
11	0 02604	-0 94758	0.79965	-0.86727	0.86192
12	0 02907	-0 86806	0.68832	-0.77899	0.75860
13	0 03198	-0 78814	0.57913	-0.69112	0.65764
14	0 03473	-0 70772	0.47285	-0.60374	0.55983

STAGE 4 ROTOR
 COORD SYSTEM ORIGIN Z -7 03590 R O.
 SECTION NO 5 SECTION EE
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	1/C	UPPER ALPHA	UPPER UPSILON	LOWER ALPHA	LOWER UPSILON
15	0 03730	-0 62674	0 .37017	-0 .51693	0 .46575
16	0 03966	-0 54515	0 .27158	-0 .43072	0 .37585
17	0 04181	-0 46313	0 .17740	-0 .34495	0 .28993
18	0 04373	-0 .38076	0 .08724	-0 .25952	0 .20740
19	0 04543	-0 .29811	0 .0066	-0 .17438	0 .12768
20	0 04691	-0 .21522	-0 .08283	-0 .08947	0 .05024
21	0 04816	-0 .13202	-0 .16367	-0 .00487	-0 .02525
22	0 04917	-0 .04850	-0 .24202	0 .07939	-0 .09894
23	0 04994	0 .03535	-0 .31798	0 .16334	-0 .17099
24	0 05046	0 .11950	-0 .39168	0 .24699	-0 .24157
25	0 05072	0 .20395	-0 .46322	-0 .33034	-0 .31087
26	0 05167	0 .28871	-0 .53266	0 .41337	-0 .37912
27	0 05027	0 .37386	-0 .60008	0 .49602	-0 .44655
28	0 04544	0 .45946	-0 .66548	0 .57821	-0 .51339
29	0 04811	0 .54560	-0 .72885	0 .65986	-0 .57985
30	0 04622	0 .63234	-0 .79016	0 .74092	-0 .64609
31	0 04371	0 .71977	-0 .84935	0 .82129	-0 .71227
32	0 04049	0 .80794	-0 .90629	0 .90091	-0 .77850
33	0 03651	0 .89691	-0 .96086	0 .97973	-0 .84490
34	0 03174	0 .98668	-1 .01296	1 .05776	-0 .91151
35	0 02610	1 .07725	-1 .06244	1 .13499	-0 .97851
36	0 01936	1 .16884	-1 .10901	1 .21119	-1 .04643
37	0 01282	1 .24606	-1 .14552	1 .27380	-1 .10386
38	0 00583	1 .31320	-1 .17568	1 .32769	-1 .15352
39	0 00583	1 .32153	-1 .17649	1 .33181	-1 .16100
40	0 00583	1 .32985	-1 .17073	1 .32985	-1 .17773
LE RAD	O 01080	CENTER AT ALPHA	-1 .45999	UPSILON	1 .54339
TE RAD	O C,342	CENTER AT ALPHA	1 .31861	UPSTILON	-1 .16340

PHASE IV ROTOR

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	STAGE	4	ROTOR	NB	20
COORD SYSTEM ORIGIN	Z	-7.03590	R O.	MU	O
SECTION NO	5	SFCITION	EE	RHO	6.5000
CHORD	3 9030	STAGGER		CAMBER	
		44 231		18.182	
AREA	O 526004	SURFACE ARC LENGTH		7.89775	
SFCITION C G.		ALPHA	UPSILON		
SURFACE SECTION C G		-0.00786	0.08023		
BLADE AXIS		-0 04051	-0.06741		
SLACKING AXIS (RADIAL)		-0.04051	-0.06741		
		-0.00220	0		

PHASE IV ROTOR

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COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 6 SECTION FF

MEANLINE INPUT DATA
 PI ALPHA ZETA THICKNESS UPSILON

1	1 53244	50.428	0.01988	1.44710
2	1 46403	50.665	0.03161	1.36406
3	1 32610	50.942	0.05597	1.19482
4	1 18650	50.835	0.08036	1.02304
5	1 04552	50.228	0.10596	0.85148
6	0 88870	48.786	0.13247	0.66725
7	0 71590	46.201	0.15907	0.47809
8	0 54154	43.076	0.18233	0.30579
9	-0 36592	40.239	0.20175	0.14987
10	0 18930	38.050	0.21713	0.00634
11	0 01175	36.205	0.22823	-0.12789
12	0 16653	34.470	0.23468	-0.25411
13	0 34554	32.718	0.23581	-0.37277
14	0 52524	30.963	0.22976	-0.48391
15	0 70542	29.262	0.21424	-0.58788
16	0 88636	27.509	0.18695	-0.68507
17	1 06803	25.575	0.14545	-0.77522
18	1 25087	23.426	0.08691	0.85780
19	1 40417	21.413	0.02288	-0.92057

MF AND INF COORDINATES WITH ORIGIN AT SECTION AXIS

PI	R/C	AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00527	-1.53244	1.44710	50.428	
2	0	0.0250	0.00861	-1.45903	1.35796	50.649
3	0	0.0500	0.01203	-1.38561	1.26805	50.862
4	0	0.0750	0.01550	-1.31219	1.17769	50.929
5	0	0.1000	0.01898	-1.23878	1.08729	50.895
6	0	0.1250	0.02446	-1.16536	0.99713	50.778
7	0	0.1500	0.02593	-1.09195	0.90757	50.509
8	0	0.1750	0.02933	-1.01853	0.81914	50.058
9	0	0.2000	0.03265	-0.94512	0.73240	49.417
10	0	0.2300	0.03647	-0.85702	0.63133	48.382
11	0	0.2600	0.04010	-0.76892	0.53429	47.102
12	0	0.2900	0.04349	-0.68082	0.44190	45.585
13	0	0.3200	0.04663	-0.59273	0.35442	44.000
14	0	0.3500	0.04951	-0.50463	0.27168	42.412
15	0	0.3800	0.05211	-0.41653	0.19324	40.971
16	0	0.4100	0.05444	-0.32843	0.11844	39.727
17	0	0.4400	0.05650	-0.24033	0.04668	38.618

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 6 SECTION FF
 RHO 6.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	PCT AL	T/C	ALPHA	UPSILON	ZETA
18	0 4700	0.05827	0.15223	-0.02244	37.629
19	0 5000	0.05976	-0.06414	0.08922	36.702
20	0 5300	0.06095	0.02396	-0.15384	35.820
21	0 5600	0.06183	0.11206	-0.21642	34.954
22	0 5900	0.06239	0.20016	0.27702	34.093
23	0 6200	0.06260	0.28826	0.33568	33.216
24	0 6500	0.06239	0.37636	-0.39239	32.321
25	0 6800	0.06170	0.46445	-0.44718	31.441
26	0 7100	0.06046	0.55255	-0.50014	30.586
27	0 7400	0.05860	0.64065	-0.55134	29.739
28	0 7700	0.05605	0.72875	-0.60081	28.894
29	0 8000	0.05275	0.81685	-0.64858	28.036
30	0 8300	0.04861	0.90495	-0.69464	27.159
31	0 8600	0.04358	0.99304	-0.73895	26.232
32	0 8900	0.03761	1.08114	-0.78143	25.240
33	0 9200	0.03063	1.16924	-0.82199	24.193
34	0 9500	0.02238	1.25734	-0.86057	23.097
35	0 9750	0.01448	1.33075	-0.89120	22.213
36	1 0000	0.00607	1.40417	-0.92057	21.413

CHORD 3 1722 STAGGER 38.878 CAMBER 29.015

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	1/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPPSILON
1	0 00527	-1 53244	1.44710	-1.53244	1.44710
2	0 00527	-1 53622	1.43971	-1.52441	1.44942
3	0 00527	-1 53418	1.43277	-1.51804	1.44613
4	0 00861	-1 47158	1.34766	-1.44647	1.36826
5	0 01203	-1 40321	1.25373	-1.36801	1.28236
6	0 01550	-1 33489	1.15927	-1.28950	1.19611
7	0 01898	-1 26656	1.06471	-1.21100	1.10987
8	0 02246	-1 19819	0.97034	1.13254	1.02392
9	0 02593	-1 12969	0.87647	-1.05421	0.93867
10	0 02933	-1 06095	0.78362	-0.97612	0.85466
11	0 03265	-0.99188	0.69235	-0.89836	0.77246
12	0 03647	-0.90845	0.58564	-0.80559	0.67701
13	0 04010	-0.82432	0.48281	-0.71352	0.58577
14	0 04349	-0.73942	0.38449	-0.62223	0.49931

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 6 SECTION FF MU O. ETA O.
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 04663	-0.65382	0.29115	-0.53163	0.41769
16	0 04951	-0.56760	0.20274	-0.44165	0.34062
17	0 05211	-0 48097	0.11903	-0.35208	0.26746
18	0 05444	-0.39406	0.03946	-0.26280	0.19741
19	0 05650	-0.30684	0.03658	-0.17383	0.12994
20	0 05827	-0.21934	0.10948	-0.08513	0.06460
21	0 05976	-0.13150	0.17959	0.00323	0.00115
22	0 06095	-0.04331	0.24705	0.09124	-0.06063
23	0 06183	0.04525	-0.31199	0.17887	-0.12084
24	0 06239	0.13420	-0.37446	0.26612	-0.17957
25	0 06260	0.22358	-0.43445	0.35293	-0.23691
26	0 06239	0.31344	-0.49183	0.43927	-0.29295
27	0 06170	0.40375	-0.54647	0.52516	-0.34789
28	0 06046	0.49453	-0.59831	0.61058	-0.40197
29	0 05860	0.58583	-0.64731	0.69547	-0.45537
30	0 05605	0.67767	-0.69337	0.77983	-0.50826
31	0 05275	0.77008	-0.73640	0.86361	-0.56076
32	0 04851	0.86309	-0.77622	0.94680	-0.61306
33	0 04358	0.95672	-0.81267	1.02937	-0.66523
34	0 03761	1.05089	-0.84559	1.11139	-0.71726
35	0 03063	1.14556	-0.87469	1.19292	-0.76929
36	0 02238	1.24078	-0.89940	1.27390	-0.82174
37	0 01448	1.32043	-0.91648	1.34108	-0.86592
38	0 00607	1.38869	-0.92924	1.39877	-0.90370
39	0 00607	1.39704	-0.92815	1.40424	-0.91050
40	0 00607	1.40417	-0.92057	1.40417	-0.92057
LE RAD	0 01049	CENTER AT ALPHA	-1.52575	UPSILON	1.43901
TE RAD	0 01401	CENTER AT ALPHA	1 39113	UPSILON	-0.91545

PHASE IV ROTOR

•ZPC•

	STAGE	4	ROTOR		NB	20
COORD SYS IFM ORIGIN	Z	-7.03590	R O.	MU	O.	ETA O.
SECTION NO	6		SECTION FF		RHO	6.0000
CHORD			STAGGER		CAMBBER	
	3.7722		38.878		29.015	
AREA	O 603658		SURFACE ARC LENGTH		7.69444	
SECTION C G.			ALPHA		UPSILON	
SURF A M SURFACE	SECTION C G.		-0.01735		-0.04598	
RADIAL AXIS			-0.05233		-0.04683	
STACKING AXIS (RADIAL)			-0.05233		-0.04683	
			-0.00220		O.	

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN	Z	-7.03590	R	0	NB	20	
SECTION NO	7	SECTION	GG	MU	O.	ETA	O.
MEANLINE INPUT DATA							

P1	ALPHA	ZETA+	THICKNESS	UPSILON
1	-1.58134	49.138	0.01886	1.32697
2	-1.50929	49.159	0.03330	1.24339
3	-1.36379	48.916	0.05285	1.07546
4	-1.21657	48.343	0.09273	0.90806
5	-1.06765	47.180	0.12223	0.74372
6	0.90221	44.774	0.15311	0.57195
7	0.72034	41.200	0.18162	0.40223
8	0.53719	38.111	0.20994	0.25078
9	0.35315	35.695	0.23168	0.11261
10	0.16844	33.371	0.24842	0.01484
11	0.01700	31.069	0.25963	-0.13207
12	0.20288	28.776	0.26479	-0.23961
13	0.38944	26.371	0.26304	-0.33779
14	0.57647	23.841	0.25285	-0.42640
15	0.76411	21.098	0.23279	-0.50519
16	0.95229	17.862	0.20120	-0.57319
17	1.14123	13.950	0.15579	-0.62810
18	1.33066	9.261	0.09266	-0.66708
19	1.48986	4.486	0.02178	-0.68490

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

P1	R/C	A1	1/C	ALPHA	UPSILON	ZETA+
1	0	0	0.00514	-1.58134	1.32697	49.188
2	0	0.0250	0.00933	-1.50458	1.23793	49.228
3	0	0.0500	0.01357	-1.42783	1.14914	49.080
4	0	0.0750	0.01783	-1.35107	1.06087	48.893
5	0	0.1000	0.02208	-1.27432	0.97330	48.622
6	0	0.1250	0.02630	-1.19756	0.88673	48.235
7	0	0.1500	0.03047	-1.12081	0.80157	47.672
8	0	0.1750	0.03454	-1.04405	0.71838	46.895
9	0	0.2000	0.03848	-0.96730	0.63777	45.859
10	0	0.2300	0.04302	-0.87519	0.54540	44.238
11	0	0.2600	0.04728	-0.78308	0.45843	42.463
12	0	0.2900	0.05126	-0.69098	0.37676	40.654
13	0	0.3200	0.05492	-0.59887	0.29996	39.033
14	0	0.3500	0.05826	-0.50677	0.22710	37.696
15	0	0.3800	0.06128	-0.41466	0.15747	36.489
16	0	0.4100	0.06397	-0.32255	0.09074	35.360
17	0	0.4400	0.06631	-0.23045	0.02673	34.228

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z		STAGE 4.		ROTOR		NB 20	
SECTION NO	7	SECTION GG		MU O.	RHO	5.5000	

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA
18	0.4700	0.06828	-0.13834	-0.03458	33.068
19	0.5000	0.06987	-0.04624	-0.09325	31.927
20	0.5300	0.07106	0.04587	-0.14941	30.821
21	0.5600	0.07185	0.13797	-0.20316	29.711
22	0.5900	0.07219	0.23008	-0.25453	28.582
23	0.6200	0.07208	0.32219	-0.30353	27.430
24	0.6500	0.07143	0.41429	-0.35014	26.252
25	0.6800	0.07022	0.50640	-0.39437	25.039
26	0.7100	0.06839	0.59850	-0.43619	23.789
27	0.7400	0.06590	0.69061	-0.47556	22.489
28	0.7700	0.06272	0.78272	-0.51243	21.132
29	0.8000	0.05877	0.87482	-0.54667	19.611
30	0.8300	0.05399	0.96693	-0.57795	17.871
31	0.8600	0.04831	1.05903	-0.60598	15.960
32	0.8900	0.04168	1.15114	-0.63058	13.906
33	0.9200	0.03397	1.24325	-0.65141	11.498
34	0.9500	0.02473	1.33535	-0.66780	8.587
35	0.9750	0.01567	1.41211	-0.67774	6.264
36	1.0000	0.00593	1.48886	-0.68490	4.486
CHORD 3.6707		STAGGER 33.236		CAMBER 44.703	

88

SURFACE COORDINATES WITH ORIGIN A' SECTION AXIS

PT	T/C	ALPHA	UPPER	UPPSILON	LOWER	ALPHA	UPSILON
1	0.00514	-1.58134	1.32697	-1.58134	1.32697		
2	0.00514	-1.58482	1.31982	-1.57377	1.32936		
3	0.00514	-1.58280	1.31329	-1.56759	1.32640		
4	0.00933	-1.51755	1.22675	-1.49161	1.24911		
5	0.01357	-1.44664	1.13283	-1.40901	1.16545		
6	0.01783	-1.37573	1.03936	-1.32642	1.08239		
7	0.02208	-1.30473	0.94651	-1.24391	1.00009		
8	0.02630	-1.23357	0.85458	-1.16155	0.91888		
9	0.03047	-1.16215	0.76392	-1.07947	0.83922		
10	0.03454	-1.09033	0.67507	-0.99777	0.76170		
11	0.03848	-1.01798	0.58858	-0.91661	0.68696		
12	0.04302	-0.93027	0.48884	-0.82011	0.60196		
13	0.04728	-0.84167	0.39441	-0.72450	0.52245		
14	0.05126	-0.75227	0.30539	-0.62969	0.44813		

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN		Z	-7.03590	R	O.	MU	O.	ETA	O.	NB	20
SECTION NO		7	SECTION GG			RHO	5.5000				
SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS											
PT	1/C	ALPHA	UPPER	UPSILON		LOWER	ALPHA	UPSILON			
15	0.05492	-0.66235	0.22166			-0.53540		0.37825			
16	0.05826	-0.57215	0.14249			-0.44138		0.31171			
17	0.06128	-0.48155	0.06704			-0.34777		0.24790			
18	0.06397	-0.39050	-0.00500			-0.25461		0.18649			
19	0.06631	-0.29890	-0.07389			-0.16200		0.12735			
20	0.06826	-0.20672	-0.13960			-0.06997		0.07044			
21	0.06987	-0.11405	-0.20208			0.02158		0.01559			
22	0.07106	-0.02095	-0.26141			0.11269		-0.03741			
23	0.07185	0.07622	-0.31769			0.20333		-0.08864			
24	0.07219	0.16669	-0.37089			0.29347		-0.13818			
25	0.07208	0.26125	-0.42094			0.38312		-0.18611			
26	0.07143	0.35630	-0.46772			0.47228		-0.23256			
27	0.07022	0.45185	-0.51113			0.56094		-0.27761			
28	0.06839	0.54788	-0.55104			0.64913		-0.32133			
29	0.06590	0.64434	-0.58731			0.73688		-0.36380			
30	0.06272	0.74122	-0.61979			0.82421		-0.40507			
31	0.05817	0.83862	-0.64828			0.91103		-0.44506			
32	0.05399	0.93652	-0.67227			0.99734		-0.48364			
33	0.04831	1.03465	-0.69123			1.08341		-0.52074			
34	0.04168	1.13275	-0.70484			1.16953		-0.55632			
35	0.03397	1.23082	-0.71251			1.25568		-0.59031			
36	0.02473	1.32858	-0.71267			1.34213		-0.62292			
37	0.01567	1.40897	-0.70633			1.41525		-0.64915			
38	0.00593	1.47719	-0.69742			1.47938		-0.67071			
39	0.00593	1.48429	-0.69409			1.48631		-0.67575			
40	0.00593	1.48886	-0.68490			1.48886		-0.68490			
I.F RAD	0.01006	CENTER AT ALPHA	-1.57477			UPSILON		1.31935			
TE RAD	0.01376	CENTER AT ALPHA	1.47514			UPSILON		-0.68380			

PHASE IV ROTOR

•ZPC•

	STAGE	4.	ROTOR	NB	20
CORD SYSTEM ORIGIN	Z	-7	03590 R O.	MU	O.
SECTION NO	7		SECTION GG	RHO	5.5000
CHORD			STAGGER 33.236		CAMBER 64.703
3 6707					
AREA	0.664510		SURFACE ARC LENGTH	7.57340	
			ALPHA		UPSILON
SECTION C.G.			-0.01101		-0.03029
SIRFAMSURFACE SECTION C.G.			-0.01546		-0.04074
BLAUF AXIS			-0.04546		-0.04074
SLACKING AXIS (RADIAL)			-0.00220		0.

PHASE IV ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 8 SECTION HI MU O ETA O.
 NB 20
 RHO 5.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA	THICKNESS	UPSILON
1	-1 58986	47.438	0.01945	1.18771
2	-1 51279	47.239	0.03662	1.10419
3	-1 35779	46.652	0.07140	0.93813
4	-1 20201	45.486	0.10583	0.77571
5	-1 04570	43.465	0.13874	0.62152
6	-0.87345	40.504	0.17193	0.46603
7	0 68560	37.192	0.20362	0.31468
8	0.49773	34.334	0.23023	0.17950
9	-0.31013	31.609	0.25181	0.05778
10	-0.12260	28.714	0.26848	-0.05097
11	0.06465	25.763	0.28037	-0.14689
12	0.25155	22.704	0.28765	-0.23036
13	0.43807	19.276	0.28989	-0.30114
14	0.62375	15.347	0.28490	-0.35799
15	0.80855	10.918	0.26870	-0.39963
16	0.99159	5.938	0.23585	-0.42507
17	1.17168	-0.196	0.18079	-0.43295
18	1.34718	-8.539	0.10219	-0.42002
19	1.48821	-17.733	0.02843	-0.38809

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCI AL	T/C	ALPHA	UPSILON	ZETA
1	0.	0.00562	-1 58986	1.18771	47.438
2	0.0250	0.01058	-1 51291	1.10432	47.189
3	0.0500	0.01557	-1 43596	1.02152	46.990
4	0.0750	0.02057	-1 35901	0.93942	46.696
5	0.1000	0.02553	-1 28206	0.85836	46.248
6	0.1250	0.03041	-1 20510	0.77886	45.580
7	0.1500	0.03518	1.12815	0.70149	44.694
8	0.1750	0.03980	-1.05120	0.62675	43.595
9	0.2000	0.04423	-0.97425	0.5506	42.330
10	0.2300	0.04927	-0.88191	0.47329	40.694
11	0.2600	0.05399	-0.78956	0.39621	39.010
12	0.2900	0.05836	-0.69722	0.32354	37.409
13	0.3200	0.06237	-0.60488	0.25482	35.911
14	0.3500	0.06603	-0.51254	0.18965	34.533
15	0.3800	0.06933	-0.42020	0.12764	33.219
16	0.4100	0.07229	-0.32785	0.06873	31.840
17	0.4400	0.07491	-0.23551	0.01296	30.407

PHASE IV ROTOR

•ZPC•

COORD S Y, IFM ORIGIN	STAGE	4.	ROTOR	NR	20
SECTION NO	8	SECTION	HH	MU	O.
PT	PCT AL	T/C	ALPHA	UPSILON	ZETA
MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS					
18	0.4700	0.07718	-0.14317	-0.03967	28.948
19	0.5000	0.07912	-0.05083	-0.08921	27.471
20	0.5300	0.08073	0.04151	-0.13571	25.983
21	0.5600	0.08201	0.13386	-0.17923	24.474
22	0.5900	0.08298	0.22620	-0.21976	22.914
23	0.6200	0.08361	0.31854	-0.25727	21.282
24	0.6500	0.08385	0.41088	-0.29165	19.526
25	0.6800	0.08361	0.50322	-0.32271	17.636
26	0.7100	0.08278	0.59557	-0.35029	15.592
27	0.7400	0.08121	0.68791	-0.37419	13.402
28	0.7700	0.07870	0.78025	-0.39426	11.101
29	0.8000	0.07502	0.87259	-0.41038	8.681
30	0.8300	0.06996	0.96494	-0.42239	6.110
31	0.8600	0.06326	1.05728	-0.43007	3.342
32	0.8900	0.05465	1.14962	-0.43301	0.246
33	0.9200	0.04393	1.24196	-0.43063	-3.322
34	0.9500	0.03141	1.33430	-0.42183	-7.683
35	0.9750	0.02003	1.41126	-0.40351	-12.143
36	1.0000	0.00822	1.48821	-0.38809	-17.733
CHORD	3 4580	STAGGER 27.110	CAMBER 65.171		

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.00562	-1.58986	1.18771	-1.58986	1.18771
2	0.00562	-1.59325	1.18017	-1.58214	1.19045
3	0.00562	-1.59099	1.17349	-1.57561	1.18765
4	0.01058	-1.52633	1.09188	-1.49949	1.11676
5	0.01557	-1.45565	1.00315	-1.41627	1.03988
6	0.02057	-1.38489	0.91503	-1.33313	0.96382
7	0.02553	-1.31394	0.82784	-1.25017	0.88888
8	0.03041	-1.24266	0.74206	-1.16755	0.81566
9	0.03518	-1.17093	0.65825	-1.08537	0.74473
10	0.03980	-1.09865	0.57691	-1.00375	0.67658
11	0.04423	-1.02574	0.49852	-0.92275	0.61159
12	0.04927	-0.93745	0.40869	-0.82636	0.53788
13	0.05399	-0.84832	0.32368	-0.73081	0.46875
14	0.05826	-0.75852	0.24339	-0.63592	0.40369

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.		STAGE 4. ROTOR		NB 20	
SECTION NO 8		SECTION HH		RHO 5.0000	
P1	1/C	UPPFER	UPPSILON	LOWER	UPPSILON
SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS					
15	0.06237	-0.66813	0.16748	-0.54163	0.34217
16	0.06503	-0.57725	0.09561	-0.44782	0.28369
17	0.06933	-0.48587	0.02736	-0.35452	0.27793
18	0.07229	-0.39379	-0.03745	-0.26191	0.17491
19	0.07491	-0.30106	-0.09873	-0.16996	0.12466
20	0.07718	-0.20776	-0.15644	-0.07858	0.07710
21	0.07912	-0.11393	-0.21057	0.01227	0.03216
22	0.08073	-0.01963	-0.26117	0.10266	-0.01024
23	0.08201	0.07511	-0.30828	0.19260	-0.05017
24	0.08298	0.17034	-0.35191	0.28206	-0.08762
25	0.08361	0.26607	-0.39197	0.37101	-0.12258
26	0.08385	0.36243	-0.42828	0.45934	-0.15501
27	0.08361	0.45943	-0.46049	0.54702	-0.18494
28	0.08278	0.55710	-0.48816	0.63404	-0.21243
29	0.08121	0.65537	-0.51078	0.72045	-0.23760
30	0.07870	0.75405	-0.52778	0.80645	-0.26074
31	0.07502	0.85301	-0.53861	0.89217	-0.28215
32	0.06996	0.95206	-0.54267	0.97781	-0.30212
33	0.06326	1.05090	-0.53926	1.06365	-0.32088
34	0.05465	1.14921	-0.52750	1.15003	-0.33852
35	0.04393	1.24636	-0.50645	1.23756	0.35480
36	0.03141	1.34156	-0.47565	1.32704	-0.36802
37	0.02003	1.41854	-0.44237	1.40397	-0.37466
38	0.00822	1.48006	-0.40917	1.47007	-0.37519
39	0.00822	1.48673	-0.40230	1.48125	-0.37850
40	0.00822	1.48821	-0.38809	1.48821	-0.38809
IE RAD	0.01048	CENTER AT ALPHA	-1.58277	UPPSILON	1.17999
IE RAD	0.01828	CENTER AT ALPHA	1.47074	UPPSILON	-0.39345

PHASE IV ROTOR

,ZPC*

COORD SYSTEM ORIGIN	Z	STAGE	4.	ROTAR	NB	20	
SECTION NO	8	SECTION	III	MU	O.	ETA	O.
CHORD		STAGGER		RHO	5.0000	CAMB	
3 45RO		27 110				65 171	
ARFA	0.705706	SURFACE ARC LENGTH					7.29278
SECTION C.G.		ALPHA		UPSILON			
STREAMSURFACE		0.01493		-0.02029			
BLADEF AXIS		0.00673		-0.05751			
SLACKING AXIS (RADIAL)		0.00673		-0.05751			
		-0.00220		0.			

COORD SYSTEM ORIGIN		STAGE	4.	ROTOR	NB	20	
SECTION NO	9	SECTION	JU	MU	O.	ETA	O.
MEANLINE INPUT DATA							
PT	ALPHA	ZETA*	THICKNESS	UPSILON			

1	-1.55904	45.684	0.02149	1.04128
2	-1.47986	45.418	0.03986	0.96061
3	-1.32167	44.598	0.07583	0.80252
4	-1.16390	42.998	0.11012	0.65153
5	-1.00677	40.578	0.14217	0.51173
6	-0.83464	37.515	0.17451	0.37287
7	-0.64789	34.087	0.20638	0.23879
8	-0.46225	30.638	0.23478	0.12161
9	-0.27798	27.167	0.25967	0.02019
10	-0.09503	23.729	0.28055	-0.06653
11	0.08612	20.361	0.29820	-0.13987
12	0.26532	16.944	0.30404	-0.20065
13	0.44204	13.201	0.30066	-0.24884
14	0.61569	9.236	0.28247	-0.28395
15	0.78529	4.870	0.24912	-0.30584
16	0.94965	-2.031	0.20598	-0.31122
17	1.10733	-13.663	0.15905	-0.29020
18	1.25708	-28.864	0.11106	-0.23075
19	1.37519	-41.889	0.07156	-0.14314

MFANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AT	T/C	ALPHA	UPSILON	ZETA*
1	0.	0.00679	-1.55904	1.04128	45.684	
2	0.0250	0.01217	-1.48568	0.96650	45.408	
3	0.0500	0.01750	-1.41232	0.89252	45.066	
4	0.0750	0.02274	-1.33897	0.81955	44.609	
5	0.1000	0.02788	-1.26561	0.74790	44.009	
6	0.1250	0.03290	-1.9226	0.67799	43.198	
7	0.1500	0.03778	-1.11890	0.61029	42.183	
8	0.1750	0.04250	-1.04555	0.54510	41.043	
9	0.2000	0.04706	-0.97219	0.48262	39.789	
10	0.2300	0.05230	-0.88416	0.41128	38.240	
11	0.2600	0.05731	-0.79614	0.34385	36.663	
12	0.2900	0.06209	-0.70811	0.28020	35.065	
13	0.3200	0.06663	-0.62008	0.22024	33.450	
14	0.3500	0.07094	-0.53206	0.16386	31.827	
15	0.3800	0.07502	-0.44403	0.11093	30.203	
16	0.4100	0.07887	-0.35600	0.06136	28.557	
17	0.4400	0.08246	-0.26798	0.01510	26.881	

PHASE IV ROTOR

ZPC

STAGE 4. ROTOR
 COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 9 SECTION J.J
 RHO 4.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA
18	0.4700	0.08577	-0.17995	-0.02793	25.222
19	0.5000	0.08876	-0.09192	-0.06789	23.614
20	0.5300	0.09139	-0.00389	-0.10493	22.026
21	0.5600	0.09356	0.08413	-0.13913	20.430
22	0.5900	0.09516	0.17216	-0.17052	18.807
23	0.6200	0.09606	0.26019	-0.19908	17.134
24	0.6500	0.09610	0.34821	-0.22476	15.379
25	0.6800	0.09512	0.43624	-0.24745	13.501
26	0.7100	0.09294	0.52427	-0.26700	11.537
27	0.7400	0.08943	0.61229	-0.28339	9.538
28	0.7700	0.08456	0.70032	-0.29653	7.395
29	0.8000	0.07850	0.78835	-0.30610	4.975
30	0.8300	0.07148	0.87637	-0.31140	1.679
31	0.8600	0.06377	0.96440	-0.31056	-3.013
32	0.8900	0.05558	1.05243	-0.30132	-9.205
33	0.9200	0.04699	1.14045	-0.28114	-16.864
34	0.9500	0.03806	1.22848	-0.24620	-26.637
35	0.9750	0.03040	1.30184	-0.20198	-35.173
36	1.0000	0.02262	1.37519	-0.14314	-41.889
CHORD	3 1643	STAGGER 21.982	CAMBER 87.574		

96

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.00679	-1.55904	1.04128	-1.55904	1.04128
2	0.00679	-1.56255	1.03281	-1.55059	1.04459
3	0.00679	-1.55982	1.02550	-1.54325	1.04174
4	0.01217	-1.49939	0.95298	-1.47197	0.98002
5	0.01750	-1.43192	0.87296	-1.39273	0.91207
6	0.02274	-1.36424	0.79393	-1.31370	0.84516
7	0.02788	-1.29626	0.71617	-1.23497	0.77963
8	0.03290	-1.22789	0.64005	-1.15663	0.71593
9	0.03778	-1.15903	0.56600	-1.07877	0.65457
10	0.04250	-1.08970	0.49439	-1.00140	0.59582
11	0.04706	-1.01984	0.42541	-0.92455	0.53983
12	0.05230	-0.93538	0.34629	-0.83295	0.47628
13	0.05731	-0.85028	0.27111	-0.74199	0.41658
14	0.06209	-0.76454	0.19980	-0.65168	0.36060

PHASE IV ROTOR

•7PC•

STAGE 4 ROTOR
 COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 9 SECTION JJ MU O. ETA O.

RHO 4.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

P1	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON N
15	0.06663	-0.67819	0.13228	-0.56198	0.30820
16	0.07094	-0.59125	0.06849	-0.47187	0.25922
17	0.07502	-0.50374	0.00835	-0.38432	0.21351
18	0.07887	-0.41565	-0.04824	-0.29635	0.17096
19	0.08246	-0.32696	-0.10127	-0.20899	0.13146
20	0.08577	-0.23777	-0.15069	-0.12213	0.09483
21	0.08876	-0.14817	-0.19656	-0.03567	0.06079
22	0.09139	-0.05812	-0.23897	0.05033	0.02911
23	0.09356	0.03246	-0.27785	0.13581	-0.00041
24	0.09516	0.12362	-0.31304	0.22070	-0.02799
25	0.09606	0.21541	-0.34431	0.30496	-0.05385
26	0.09610	0.30789	-0.37137	0.38654	-0.07816
27	0.09512	0.40110	-0.39379	0.47158	-0.10112
28	0.09294	0.49486	-0.41107	0.55367	-0.12294
29	0.08943	0.58885	-0.42292	0.63574	-0.14385
30	0.08456	0.68310	-0.42920	0.71754	-0.16385
31	0.07850	0.77758	-0.42983	0.79912	-0.18238
32	0.07148	0.87305	-0.42445	0.87969	-0.19836
33	0.06377	0.96970	-0.41131	0.95910	-0.20981
34	0.05558	1.06649	-0.38812	1.03836	-0.21453
35	0.04699	1.16202	-0.35229	1.11889	-0.21000
36	0.03806	1.25548	-0.30003	1.20148	-0.19236
37	0.03040	1.32954	-0.24130	1.27413	-0.16267
38	0.02262	1.37396	-0.19759	1.32475	-0.13400
39	0.02262	1.38429	-0.17746	1.35231	-0.12977
40	0.02262	1.37519	-0.14314	1.37519	-0.14314
LF RAD	0.01165	CENTER AT ALPHA	-1.55089	UPSILON	1.03294
RE RAD	0.04070	CENTER AT ALPHA	1.34433	'UPSILON	-0.16968

PHASE IV ROTOR

	STAGE	4.	ROTOR		NB	20	
COORD SYSTEM ORIGIN	Z	-7.03590	R O.	MU	O.	ETA	O.
SECTION NO	9		SECTION JJ		RHO	4.5000	
CHORD	3 1643		STAGGER 21.982		CAMBER		
AREA	0.664729		SURFACE ARC LENGTH	6.87514	87.574		
SFC SECTION C.G.			ALPHA		UPSILON		
STREAM SURFACE SECTION C.G.			-0.00726		-0.00142		
RADIAL AXIS			0.04647		-0.05830		
STACKING AXIS (RADIAL)			0.04647		-0.05830		
			-0.00220		0.		

PILOT IV ROTOR

•ZRC•

STAGE 4. ROTOR
 COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 10 SECTION KK

NB 20
 MU 0. ETA 0.
 RHO 4.0000

MEANLINE INPUT DATA

P1	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.52196	43.955	0.02405	0.90476
2	-1.44355	43.542	0.04238	0.83013
3	-1.28758	42.372	0.07901	0.68560
4	1.13314	40.460	0.11568	0.54944
5	-0.98019	37.803	0.15225	0.42453
6	0.81355	34.439	0.19136	0.30221
7	0.63364	30.682	0.23115	0.18664
8	-0.45568	27.040	0.26607	0.08797
9	0.27972	23.523	0.29403	0.00436
10	0.10573	20.127	0.31290	-0.06551
11	0.06578	16.981	0.32125	-0.12297
12	0.23439	13.962	0.31919	-0.16941
13	0.39937	10.459	0.30906	-0.20488
14	0.55989	5.764	0.29445	-0.22782
15	0.71473	-1.872	0.27766	-0.23359
16	0.86293	-14.539	0.25491	-0.21233
17	1.00348	-31.007	0.21833	-0.15116
18	1.13591	-46.939	0.16791	-0.03770
19	1.23993	-57.531	0.11973	0.10666

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

P1	PCI	AI	I/C	ALPHA	UPSILON	ZETA*
1	0	0.00836	-1.52196	0.90476	43.955	
2	0.0250	0.01398	-1.45291	0.83897	43.351	
3	0.0500	0.01960	-1.38387	0.77420	42.966	
4	0.0750	0.02525	-1.31482	0.71043	42.461	
5	0.1000	0.03092	-1.24577	0.64792	41.821	
6	0.1250	0.03662	-1.17672	0.58697	41.025	
7	0.1500	0.04236	-1.10768	0.52788	40.063	
8	0.1750	0.04810	-1.03863	0.47091	38.956	
9	0.2000	0.05384	-0.96958	0.41630	37.701	
10	0.2300	0.06065	-0.88673	0.35409	36.079	
11	0.2600	0.06734	-0.80387	0.29556	34.378	
12	0.2900	0.07383	-0.72101	0.24069	32.646	
13	0.3200	0.08007	-0.63816	0.18934	30.920	
14	0.3500	0.08598	-0.55530	0.14138	29.210	
15	0.3800	0.09149	-0.47244	0.09664	27.522	
16	0.4100	0.09652	-0.38959	0.05499	25.850	
17	0.4400	0.10096	-0.30673	0.01633	24.171	

PHASE IV ROTOR

*7PC.

COORD SYSTEM ORIGIN	Z	-7.03570	R	O.	MU	NB	20
SECTION NO	10	SECTION	KK		O.	ETA	O.
				RHO	4.0000		

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AL	T/C	ALPHA	UPSILON	ZETA
18	0	4700	0	10475	-0.22387	-0.01941
19	0	5000	0	10779	-0.14102	-0.05232
20	0	5300	0	11002	-0.05816	-0.08253
21	0	5600	0	11139	0.02470	-0.11017
22	0	5900	0	11188	0.10755	-0.13539
23	0	6200	0	11153	0.19041	-0.15824
24	0	6500	0	11041	0.27327	-0.17870
25	0	6800	0	10864	0.35612	-0.19661
26	0	7100	0	10636	0.43898	-0.21175
27	0	7400	0	10372	0.52184	-0.22364
28	0	7700	0	10085	0.60469	-0.23155
29	0	8000	0	0.09770	0.68775	-0.23418
30	0	8300	0	0.09406	0.77040	-0.22964
31	0	8600	0	0.08933	0.85326	-0.21489
32	0	8900	0	0.08279	0.93612	-0.18632
33	0	9200	0	0.07416	1.01897	-0.14141
34	0	9500	0	0.06341	1.10183	-0.07459
35	0	9750	0	0.05296	1.17088	-0.00681
36	1	0000	0	0.04165	1.23993	0.10666
CHORD					STAGGER	CAMBER
2	8749				16.118	100.122

100

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	1/C	ALPHA	UPPER	UPPSILON	LOWER	ALPHA	UPSILON
1	0.00876	-1.52196	0.90476	-1.52196	0.90476	0.90476	0.90476
2	0.00836	-1.52559	0.89512	-1.51266	0.90878	0.90878	0.90878
3	0.00836	-1.522234	0.88706	-1.50431	0.90588	0.90588	0.90588
4	0.01398	-1.46671	0.82435	-1.43912	0.85358	0.85358	0.85358
5	0.01960	-1.40307	0.75358	-1.36466	0.79482	0.79482	0.79482
6	0.02525	-1.33932	0.68366	-1.29032	0.73720	0.73720	0.73720
7	0.03092	-1.27541	0.61480	-1.21614	0.68105	0.68105	0.68105
8	0.03662	-1.21128	0.54725	-1.14217	0.62669	0.62669	0.62669
9	0.04236	-1.14686	0.48128	-1.06849	0.57447	0.57447	0.57447
10	0.04810	-1.08210	0.41714	-0.99516	0.52468	0.52468	0.52468
11	0.05384	-1.01691	0.35507	-0.92226	0.47753	0.47753	0.47753
12	0.06065	-0.93807	0.28363	-0.83539	0.42455	0.42455	0.42455
13	0.06734	-0.85852	0.21567	-0.74922	0.37544	0.37544	0.37544
14	0.07383	-0.77826	0.15132	-0.66376	0.33005	0.33005	0.33005

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O
 SECTION NO 10 SECTION KK MU O. ETA O.
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	1/C	STAGE	4.	ROTOR	NR	20
		SECTION	KK	MU	O.	ETA
		UPPER	ALPHA	UPSILON	LOWER	ALPHA
						UPSILON
15	0.08007	-0.69730	0.09060	-0.57901	0.28808	
16	0.08598	-0.61562	0.03350	-0.49498	0.24426	
17	0.09149	-0.53321	-0.01999	-0.41167	0.21328	
18	0.09652	-0.45008	-0.06986	-0.32910	0.17985	
19	0.10096	-0.36616	-0.11608	-0.24731	0.14874	
20	0.10475	-0.28148	-0.15852	-0.16627	0.11971	
21	0.10779	-0.19614	-0.19712	-0.09589	0.09248	
22	0.11002	-0.11024	-0.23185	-0.00608	0.06679	
23	0.11139	-0.02392	-0.26272	0.07331	0.04239	
24	0.11188	0.06273	-0.28984	0.15237	0.01907	
25	0.11153	0.14985	-0.31335	0.23097	-0.00314	
26	0.11041	0.23740	-0.33331	0.30913	-0.02409	
27	0.10864	0.32550	-0.34975	0.38674	-0.04348	
28	0.10636	0.41417	-0.36261	0.46379	-0.06089	
29	0.10372	0.50391	-0.37164	0.53976	-0.07563	
30	0.10085	0.59498	-0.37618	0.61441	-0.08691	
31	0.09770	0.68857	-0.37462	0.68653	0.09374	
32	0.09406	0.78504	-0.36405	0.75577	-0.09524	
33	0.08933	0.88498	-0.33931	0.82154	-0.09046	
34	0.08279	0.98395	-0.29529	0.88828	-0.07735	
35	0.07416	1.07719	-0.23072	0.96076	-0.05210	
36	0.06341	1.16596	-0.13936	1.03770	-0.00982	
37	0.05296	1.23212	-0.03840	1.10964	0.05203	
38	0.04165	1.26268	0.01868	1.15062	0.09570	
39	0.04165	1.26971	0.05756	1.19344	0.11790	
40	0.04165	1.23993	0.10666	1.23993	0.10666	
LE RAD	0.01308	CENTER AT ALPHA	-1.51253	UPSILON	0.89570	
TE RAD	0.06858	CENTER AT ALPHA	1.20158	UPSILON	0.04981	

PHASE IV ROTOR

*ZPC.

	STAGE	4.	ROTUR	NB	20
COORD SYSTEM ORIGIN	Z	-7.03590	R O.	MU	O.
SECTION NO	10	SECTION KK		RHO	4.0000
CHORD		SLAGGER		CAMBER	
	2.8749	16.118		100 122	
AREA	O 699880	SURFACE ARC LENGTH	6.56806		
SECTION C.G.		ALPHA	UPSILON		
SURFACE SECTION C.G.		0.01136	0.00566		
BLADE AXIS		-0.02420	-0.02728		
STACKING AXIS (RADIAL)		-0.02420	-0.02728		
		-0.00220	O.		

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 11 SECTION LL MU O. ETA O.

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.49758	41.792	0.07987	0.78332
2	-1.42164	41.071	0.05117	C.71576
3	-1.27107	39.284	0.09458	C.58721
4	1.12208	36.896	0.13753	0.46933
5	0.97445	34.059	0.17798	0.36388
6	0.81378	30.908	0.21785	0.26199
7	-0.64055	27.587	0.25468	0.16562
8	-0.46943	24.227	0.28418	0.08316
9	0.30060	20.890	0.30635	0.01382
10	0.13437	17.869	0.32163	-0.04375
11	0.02873	15.214	0.33107	-0.09149
12	0.18818	12.407	0.33619	-0.13044
13	0.34327	8.511	0.33873	-0.15912
14	0.49288	1.914	0.33996	-0.17283
15	0.63619	-9.901	0.33781	-0.16200
16	0.77151	-26.756	0.32290	-0.11284
17	0.89757	-44.077	0.28446	-0.01151
18	1.01427	-57.851	0.22569	0.15552
19	1.10463	-66.003	0.16790	0.35647

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	R/C	AI.	T/C	ALPHA	UPSILON	ZETA*
1	0	0.01133	-1.49758	0.78332	41.792	
2	0.0250	0.01824	-1.43252	0.72537	41.492	
3	0.0500	0.02527	-1.36747	0.66855	40.760	
4	0.0750	0.03241	-1.30241	0.61326	39.942	
5	0.1000	0.03958	-1.23736	0.55964	39.029	
6	0.1250	0.04672	-1.17230	0.50787	37.962	
7	0.1500	0.05374	-1.10725	0.45821	36.724	
8	0.1750	0.06060	-1.04219	0.41082	35.412	
9	0.2000	0.06723	-0.97714	0.36569	34.071	
10	0.2300	0.07482	-0.89007	0.31448	32.464	
11	0.2600	0.08197	-0.82101	0.26630	30.906	
12	0.2900	0.08863	-0.74294	0.22096	29.383	
13	0.3200	0.09478	-0.66487	0.17835	27.868	
14	0.3500	0.10038	-0.58681	0.13838	26.353	
15	0.3800	0.10543	-0.50874	0.10100	24.806	
16	0.4100	0.10993	-0.43067	0.06621	23.232	
17	0.4400	0.11386	-0.35261	0.03395	21.672	

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN	Z	-7.03590	R	O.	MU	NB	20
SECTION NO	11	SECTION	LL		RHO	3.5000	

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0.11724	-0.27454	0.00413	20.143
19	0 5000	0.120C8	0.19647	-0.02338	18.700
20	0 5300	0.12240	-0.11841	-0.04878	17.363
21	0 5600	0.12426	-0.04034	-0.07225	16.102
22	0 5900	0.12569	0.03772	-0.09389	14.903
23	0 6200	0.12677	0.11579	-0.11376	13.626
24	0 6500	0.12754	0.19386	-0.13167	12.178
25	0 6800	0.12809	0.27192	-0.14730	10.392
26	0 7100	0.12848	0.34999	0.16009	8.131
27	0 7400	0.12878	0.42806	-0.16918	4.945
28	0 7700	0.12893	0.50612	-0.17304	0.486
29	0 8000	0.12873	0.58419	-0.16965	-5.798
30	0 8300	0.12757	0.66225	-0.15619	-14.081
31	0 8600	0.12451	0.74032	-0.12883	-24.783
32	0 8900	0.11820	0.81839	-0.08240	-36.370
33	0 9200	0.10805	0.89645	-0.01269	-46.573
34	0 9500	0.09409	0.97452	0.08696	-57.130
35	0 9750	0.07972	1.03958	0.20696	-64.936
36	1.0000	0.06367	1.10463	0.35647	-67.195
CHORD					
2 6370		9.315			108.987

104

PT	1/C	UPPER	UPPER	LOWER	LOWER
		ALPHA	UPSILON	ALPHA	UPSILON
1	0.01133	-1.49758	0.78332	-1.49758	0.78332
2	0.01133	-1.50177	0.77109	-1.48614	0.78880
3	0.01133	-1.49751	0.76113	-1.47953	0.78568
4	0.01824	-1.44846	0.70736	-1.41659	0.74338
5	0.02527	-1.38922	0.64331	-1.34571	0.69378
6	0.03241	-1.32985	0.58050	-1.27498	0.64602
7	0.03958	-1.27022	0.51910	-1.20449	0.60018
8	0.04672	-1.21019	0.45931	-1.13441	0.55644
9	0.05374	-1.14962	0.40141	-1.06488	0.51500
10	0.06060	-1.08849	0.34570	-0.99590	0.47593
11	0.06723	-1.02679	0.29227	-0.92748	0.43912
12	0.07482	-0.95203	0.23124	-0.84612	0.39772
13	0.08197	-0.87652	0.17356	-0.76549	0.35903
14	0.08863	-0.80028	0.11913	-0.68560	0.32279

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	1/C	UPPER	UPPER	LOWER	LOWER
		ALPHA	UPSILON	ALPHA	UPSILON
1	0.01133	-1.49758	0.78332	-1.49758	0.78332
2	0.01133	-1.50177	0.77109	-1.48614	0.78880
3	0.01133	-1.49751	0.76113	-1.47953	0.78568
4	0.01824	-1.44846	0.70736	-1.41659	0.74338
5	0.02527	-1.38922	0.64331	-1.34571	0.69378
6	0.03241	-1.32985	0.58050	-1.27498	0.64602
7	0.03958	-1.27022	0.51910	-1.20449	0.60018
8	0.04672	-1.21019	0.45931	-1.13441	0.55644
9	0.05374	-1.14962	0.40141	-1.06488	0.51500
10	0.06060	-1.08849	0.34570	-0.99590	0.47593
11	0.06723	-1.02679	0.29227	-0.92748	0.43912
12	0.07482	-0.95203	0.23124	-0.84612	0.39772
13	0.08197	-0.87652	0.17356	-0.76549	0.35903
14	0.08863	-0.80028	0.11913	-0.68560	0.32279

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 11 SECTION LL
 SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	STAGE	4.	ROTOR	NB	20
				MU	O.	ETA U.
				RHO	3.5000	
15	0 09478	-0. 72328	0. 06788	-0. 60646	0. 28882	
16	0 10038	-0. 64556	0. 01978	-0. 52805	0. 25697	
17	0 10543	-0. 56706	-0. 02519	-0. 45042	0. 22719	
18	0 10993	-0. 48785	-0. 06698	-0. 37350	0. 19940	
19	0 11386	-0. 40805	0. 10557	-0. 29717	0. 17346	
20	0 11724	-0. 32777	-0. 14100	-0. 22131	0. 14926	
21	0 12008	-0. 24723	-0. 17335	-0. 14572	0. 12658	
22	0 12240	-0. 16657	-0. 20282	-0. 07025	0. 10525	
23	0 12426	-0. 08578	-0. 22965	0. 00510	0. 08516	
24	0 12569	-0. 00490	-0. 25405	0. 08035	0. 06626	
25	0 12677	0. 07641	-0. 27620	0. 15517	0. 04867	
26	0 12754	0. 15838	-0. 29604	0. 29333	0. 03271	
27	0 12809	0. 24146	-0. 31341	0. 30239	0. 01881	
28	0 12848	0. 32603	-0. 32779	0. 37395	0. 00761	
29	0 12878	0. 41342	-0. 33835	0. 44269	-0. 00002	
30	0 12893	0. 50468	-0. 34303	0. 50757	-0. 00305	
31	0 12873	0. 60133	-0. 33851	0. 56704	-0. 00079	
32	0 12757	0. 70318	-0. 31934	0. 62133	0. 00695	
33	0 12451	0. 80914	-0. 27788	0. 67150	0. 02023	
34	0 11805	0. 91081	-0. 20789	0. 72597	0. 04310	
35	0 10805	0. 99991	-0. 11062	0. 79299	0. 08524	
36	0 09409	1. 07871	0. 01963	0. 87033	0. 15428	
37	0 07972	1. 13478	0. 16243	0. 94437	0. 25148	
38	0 06367	1. 15910	0. 24184	0. 98474	0. 31712	
39	0 06367	1. 15804	0. 29838	1. 03667	0. 35914	
40	0 06367	1. 10463	0. 35647	1. 10463	0. 35647	
LE RAD	0 01656	CENTER AT ALPHA	-1. 48524	UPSILON	0. 77227	
RF RAD	0 09572	CENTER AT ALPHA	1. 06714	UPSILON	0. 26840	

PHASE IV ROTOR

♦ZPC♦

	STAGE	4.	ROTOR		NR	20	
CONDN SYSTEM ORIGIN	2	-7.03590	R O.	MU	O.	ETA	O.
SECTION NO	11	SECTION L.L		RHO	3.5000		
CHORD		SLACKER		CAMBER			
2 6370		9.315		108.987			
AREA	0.766645	SURFACE ARC LENGTH	6.39471	ALPHA	UPSILON		
SECTION C.G.				0.03076	0.04001		
STREAM SURFACE SECTION C.G.				-0.00152	-0.01220		
BIAxis				-0.00152	-0.01220		
SLACKING AXIS (RADIAL)				-0.00220	O.		

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SFCITION NO 12 SFCITION MM MU O. ETA O.

RHO 3.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.48278	38.375	0.04053	0.68854
2	-1.40890	37.427	0.06289	0.63160
3	-1.26267	35.432	0.10589	0.52511
4	-1.11822	33.324	0.14561	0.42796
5	0.97544	31.209	0.18137	0.33938
6	-0.82018	28.755	0.21602	0.25095
7	-0.65298	25.551	0.24870	0.16574
8	-0.48802	21.974	0.27650	0.09347
9	0.32562	18.575	0.30002	0.03376
10	0.16635	15.937	0.31988	-0.01562
11	-0.01070	13.717	0.33722	-0.05703
12	0.14056	10.984	0.35342	-0.09052
13	0.28653	6.582	0.36959	-0.11323
14	0.42571	-1.960	0.38600	-0.11785
15	0.55764	-17.558	0.39798	-0.09040
16	0.68010	-36.834	0.39089	-0.01336
17	0.79166	-53.175	0.35059	0.12813
18	0.89263	-64.664	0.28346	0.34874
19	0.96934	-71.103	0.21607	0.60629

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.01652	-1.48278	0.68854	38.375
2	0.0250	0.02409	-1.42148	0.64112	37.177
3	0.0500	0.03157	-1.36018	0.59527	36.408
4	0.0750	0.03891	-1.29888	0.55074	35.563
5	0.1000	0.04606	-1.23757	0.50765	34.630
6	0.1250	0.05300	-1.17627	0.46605	33.699
7	0.1500	0.05970	-1.11497	0.42586	32.792
8	0.1750	0.06613	-1.05366	0.38704	31.906
9	0.2000	0.07228	-0.99236	0.34951	31.036
10	0.2300	0.07928	-0.91880	0.30615	29.985
11	0.2600	0.08588	-0.84523	0.26465	28.865
12	0.2900	0.09211	-0.77167	0.22508	27.655
13	0.3200	0.09796	-0.69811	0.18761	26.303
14	0.3500	0.10344	-0.62454	0.15242	24.805
15	0.3800	0.10857	-0.55098	0.11962	23.244
16	0.4100	0.11337	-0.47742	0.08923	21.643
17	0.4400	0.11785	-0.40385	0.06120	20.096

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN	Z	-7.03590	R	O.	MU	NB	20
SECTION NO	12	SECTION	MM		RHO	ETA	O
P/T	PCT AL	T/C	ALPHA	UPSILON	ZETA		
18	0.4700	0.12203	-0.33029	0.03533	18.665		
19	0.5000	0.12592	-0.25672	0.01142	17.370		
20	0.5300	0.12957	-0.18316	0.01077	16.231		
21	0.5600	0.13302	-0.10960	-0.03147	15.200		
22	0.5900	0.13633	-0.03603	-0.05074	14.148		
23	0.6200	0.13955	0.03753	-0.06853	13.016		
24	0.6500	0.14276	0.11109	-0.08463	11.621		
25	0.6800	0.14599	0.18466	-0.09865	9.855		
26	0.7100	0.14932	0.25822	-0.10987	7.354		
27	0.7400	0.15280	0.33178	-0.11724	3.815		
28	0.7700	0.15635	0.40535	0.11880	-1.736		
29	0.8000	0.15974	0.47891	-0.11178	-9.640		
30	0.8300	0.16211	0.55248	-0.09235	-20.233		
31	0.8600	0.16212	0.62604	-0.05560	-32.968		
32	0.8900	0.15751	0.69960	0.00575	-46.031		
33	0.9200	0.14663	0.77317	0.09898	-56.501		
34	0.9500	0.12942	0.84673	0.23245	-65.546		
35	0.9750	0.11034	0.90803	0.39542	-72.387		
36	1.0000	0.08807	0.96934	0.60629	-74.413		
CHORD						CAMBER	
2.4535						1.921	112.788

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

P/T	1/C	ALPHA	UPPER UPSILON	LOWER UPSILON	ALPHA	
1	0.01652	-1.48278	0.68854	-1.48278	0.68854	
2	0.01652	-1.48744	0.67139	-1.46783	0.69709	
3	0.01652	-1.48088	0.65824	-1.45303	0.69401	
4	0.02409	-1.43934	0.61758	-1.40363	0.66466	
5	0.03157	-1.38316	0.56410	-1.33719	0.62643	
6	0.03891	1.32663	0.51191	-1.27112	0.58956	
7	0.04606	-1.26969	0.46115	-1.20546	0.55415	
8	0.05300	-1.1735	0.41195	-1.14019	0.52014	
9	0.05970	-1.15463	0.36430	-1.07530	0.48743	
10	0.06613	-1.09654	0.31817	-1.01079	0.45590	
11	0.07228	-1.03807	0.27354	-0.94665	0.42548	
12	0.07928	-0.96740	0.22191	-0.87019	0.39039	
13	0.08588	-0.89609	0.17238	-0.79437	0.35691	
14	0.09211	-0.82411	0.12500	-0.71923	0.32517	

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

P/T	1/C	ALPHA	UPPER UPSILON	LOWER UPSILON	ALPHA	
1	0.01652	-1.48278	0.68854	-1.48278	0.68854	
2	0.01652	-1.48744	0.67139	-1.46783	0.69709	
3	0.01652	-1.48088	0.65824	-1.45303	0.69401	
4	0.02409	-1.43934	0.61758	-1.40363	0.66466	
5	0.03157	-1.38316	0.56410	-1.33719	0.62643	
6	0.03891	1.32663	0.51191	-1.27112	0.58956	
7	0.04606	-1.26969	0.46115	-1.20546	0.55415	
8	0.05300	-1.1735	0.41195	-1.14019	0.52014	
9	0.05970	-1.15463	0.36430	-1.07530	0.48743	
10	0.06613	-1.09654	0.31817	-1.01079	0.45590	
11	0.07228	-1.03807	0.27354	-0.94665	0.42548	
12	0.07928	-0.96740	0.22191	-0.87019	0.39039	
13	0.08588	-0.89609	0.17238	-0.79437	0.35691	
14	0.09211	-0.82411	0.12500	-0.71923	0.32517	

PHASE IV ROTOR

•ZPC•

STAGE 4. ROTOR
 COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 12 SECTION MM
 NB 20
 MU O ETA O.
 RHO 3.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0.09796	-0.75135	0.07989	-0.64186	0.29534
16	0.10344	-0.67778	0.03723	-0.57130	0.26761
17	0.10857	-0.60354	-0.00276	-0.49842	0.24201
18	0.11337	-0.52871	-0.04004	-0.42612	0.21850
19	0.11785	-0.45352	-0.07457	-0.35418	0.19697
20	0.12203	-0.37820	-0.10649	-0.28238	0.17716
21	0.12592	-0.30284	-0.13601	-0.21061	0.15885
22	0.12957	-0.22759	-0.16339	-0.13873	0.14185
23	0.13302	-0.15238	-0.18894	-0.06681	0.12601
24	0.13633	-0.07691	-0.21290	0.00484	0.11143
25	0.13955	-0.00103	-0.23533	0.07609	0.09827
26	0.14276	0.07582	-0.25617	0.14637	0.08691
27	0.14599	0.15400	-0.27510	0.21531	0.07781
28	0.14932	0.23477	-0.29153	0.28167	0.07180
29	0.15280	0.31931	-0.30427	0.34426	0.06979
30	0.15635	0.41116	-0.31052	0.39954	0.07292
31	0.15974	0.51173	-0.30497	0.44610	0.08141
32	0.16211	0.62125	-0.27895	0.49370	0.09425
33	0.16212	0.73426	-0.22245	0.51781	0.11126
34	0.15751	0.83867	-0.12840	0.56054	0.13991
35	0.14663	0.92316	-0.00030	0.62317	0.19826
36	0.2942	0.99126	0.16673	0.70220	0.29818
37	0.11C34	1.03705	0.35446	0.77902	0.43638
38	0.08807	1.05686	0.46943	0.82335	0.53629
39	0.08807	1.04591	0.54234	0.88151	0.59810
40	0.08807	0.96934	0.60629	0.96934	0.60629
I.E RAD	0.02283	CENTER AT ALPHA	-1 46482	UPSILON	0.67446
TF RAD	0.12235	CENTER AT ALPHA	0 93601	UPSILON	0.48856

PHASE IV ROTOR

7PC

	STAGE	4.	ROTOR	NB	20
COORD SYSTEM ORIGIN	Z	-7.03590	R O.	MU	O.
SECTION NO	12	SECTION	MM	RHO	3.0000
CHORD		STAGGER		CAMBERR	
2.4535		1.921		112.788	
AREA	0.825787	SURFACE ARC LENGTH	6.33790		
SECTION C G.		ALPHA	UPSILON		
STREAM SURFACE SECTION C.G.		0.07163	0.09684		
BLADE AXIS		0.04746	-0.00208		
STACKING AXIS (RADIAL)		0.04746	-0.00208		
		-0.00220	0.		

PHASE IV ROTOR

•7FCC•

COORD SYS1FM ORIGIN Z -7.03590 R O.
 SECTION NO 13 SECTION NN
 MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.46882	33.562	0.05425	0.61515
2	-1.39730	32.688	0.07405	0.56913
3	-1.25552	31.044	0.11166	0.48240
4	-1.1563	29.700	0.14623	0.40131
5	-0.97756	28.602	0.17755	0.32448
6	-0.82745	26.838	0.20863	0.24504
7	0.66594	23.586	0.23936	0.16815
8	0.50689	19.689	0.26725	0.10468
9	0.35076	16.206	0.29321	0.05397
10	-0.19835	13.969	0.31808	0.01253
11	-0.05013	12.201	0.34336	-0.02258
12	0.09293	9.546	0.37065	-0.05060
13	0.22978	4.638	0.40044	-0.06734
14	0.35853	-5.816	0.43204	-0.06288
15	0.47909	-24.620	0.45815	-0.01881
16	0.58868	-44.823	0.45888	0.08613
17	0.68575	-59.575	0.41672	0.26778
18	0.71100	-69.205	0.34123	0.54196
19	0.83404	-74.459	0.26425	0.85610

111

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0.	0.02343	-1.46882	0.61515	32.937
2	0.0250	0.03032	-1.41125	0.57802	32.585
3	0.0500	0.03709	-1.35368	0.54180	31.765
4	0.0750	0.04368	-1.29611	0.50665	31.067
5	0.1000	0.05010	-1.23854	0.47235	30.520
6	0.1250	0.05633	-1.18097	0.43874	30.047
7	0.1500	0.06236	-1.12339	0.40573	29.623
8	0.1750	0.06817	-1.06582	0.37325	29.229
9	0.2000	0.07378	-1.00825	0.34130	28.831
10	0.2300	0.08023	-0.93916	0.30366	28.308
11	0.2600	0.08641	-0.87008	0.26700	27.547
12	0.2900	0.09236	-0.80099	0.23172	26.512
13	0.3200	0.09809	-0.73191	0.19820	25.214
14	0.3500	0.10362	-0.66282	0.16678	23.642
15	0.3800	0.10895	-0.59373	0.13775	21.932
16	0.4100	0.11412	-0.52465	0.11113	20.208
17	0.4400	0.11916	-0.45556	0.08686	18.533

PHASE IV ROTOR

•ZPC•

COORD SYSTEM ORIGIN Z -7.03590 R O.
 SECTION NO 13 SECTION NN MU O.
 RHO 2.5000

MFANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	P/C1 AL.	T/C	ALPHA	UPSILON	ZETA*
18	0.4700	0.12410	-0.38648	0.06471	17.065
19	0.5000	0.12898	-0.31739	0.04434	15.823
20	0.5300	0.13384	-0.24830	0.02545	14.802
21	0.5600	0.13874	0.17922	0.00773	13.995
22	0.5900	0.14376	-0.11013	-0.00898	13.171
23	0.6200	0.14900	-0.04105	-0.02456	12.238
24	0.6500	0.15455	0.02804	-0.03882	11.017
25	0.6800	0.16044	0.09712	-0.05130	9.392
26	0.7100	0.16674	0.16621	-0.06134	6.949
27	0.7400	0.17350	0.23530	-0.07668	3.338
28	0.7700	0.18075	0.30438	-0.06844	-2.609
29	0.8000	0.18820	0.37347	-0.06011	-11.623
30	0.8300	0.19505	0.44255	-0.03809	-24.098
31	0.8600	0.19958	0.51164	0.00395	-38.380
32	0.8900	0.19880	0.58073	0.07544	-52.607
33	0.9200	0.18902	0.64981	0.18869	-63.383
34	0.9500	0.16920	0.71890	0.35586	-71.247
35	0.9750	0.14472	0.77647	0.56599	-77.401
36	1.0000	0.11412	0.83404	0.85610	-79.357
CHORD 2	3154	STAGGER -5.973	CAMBER 112.295		

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.02343	-1.46882	0.61515	-1.46882	0.61515
2	0.02343	-1.47299	0.59187	-1.44979	0.62832
3	0.02343	-1.46266	0.57505	-1.42980	0.62590
4	0.03032	-1.43016	0.54844	-1.39235	0.60760
5	0.03709	-1.37629	0.50529	-1.33107	0.57831
6	0.04368	-1.32221	0.46333	-1.27001	0.54997
7	0.05010	-1.26799	0.42239	-1.20908	0.52232
8	0.05633	-1.21362	0.38229	-1.14831	0.49519
9	0.06236	-1.15908	0.34297	-1.08771	0.46848
10	0.06817	-1.10436	0.30438	-1.02728	0.44213
11	0.07378	-1.04944	0.26647	-0.96706	0.41612
12	0.08023	-0.98321	0.22188	-0.89512	0.38544
13	0.08641	-0.91634	0.17831	-0.82381	0.35570
14	0.09236	-0.84872	0.13604	-0.75326	0.32740

PHASE IV R010R

7PC

STAGE 4. ROTOR		
COORD SYSTEM ORIGIN Z	-7.03590 R	O.
NB	20	
MU O.		ETA O.
SECTION NO 13	SECTION NN	RHO 2.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	I/C	ALPHA	UPPSILON	LOWER ALPHA		UPPSILON
				UPPER	UPPSILON	
15	0 09809	-0.78028	0.09545	-0.68353	0.30094	
16	0 10362	-0.71093	0.05689	-0.61471	0.27667	
17	0 10895	-0.64085	0.02075	-0.54662	0.25476	
18	0. 11412	-0.57028	-0.01285	-0.47901	0.23511	
19	0. 11916	-0.49941	-0.04393	-0.41172	0.21766	
20	0. 12410	-0.42864	-0.07264	-0.34432	0.20206	
21	0 12898	-0.35811	-0.09933	-0.27668	0.18800	
22	0 13384	-0.28789	-0.12436	-0.20872	0.17525	
23	0. 13874	-0.21806	-0.14812	-0.14038	0.16358	
24	0. 14376	-0.14805	-0.17103	-0.07221	0.15308	
25	0 14900	-0.07761	-0.19314	-0.00448	0.14402	
26	0. 15455	-0.00615	-0.21445	0.06223	0.13680	
27	0 16044	0.06681	-0.23456	0.12744	0.13196	
28	0. 16674	0.14286	-0.25295	0.18956	0.13028	
29	0. 17350	0.22360	-0.26821	0.24699	0.13285	
30	0 18075	0.31391	-0.27749	0.29486	0.14060	
31	0. 18820	0.41736	-0.27352	0.32957	0.15330	
32	0 19505	0.53475	-0.24422	0.35035	0.16805	
33	0. 19958	0.65510	-0.17718	0.36818	0.18507	
34	0 19880	0.76358	-0.06433	0.39787	0.21520	
35	0. 19902	0.84546	0.09064	0.45417	0.28673	
36	0. 16920	0.90439	0.29288	0.53341	0.41884	
37	0 14472	0.93998	0.52945	0.61296	0.60254	
38	0. 11412	0.95438	0.69939	0.66467	0.75523	
39	0 11412	0.93299	0.78762	0.72766	0.83626	
40	0 11412	0.83404	0.85610	0.83404	0.85610	
LE RAD	0 03048	CENTER AT ALPHA	-1.44326	UPPSILON	0.59855	
TE RAD	0 14855	CENTER AT ALPHA	0.80622	UPPSILON	0.71018	

PHASE IV ROTOR

•ZPC.

	STAGE	4.	ROTOR	NB	20
COORD SYSTEM ORIGIN	Z	-7.03590	R O.	MU	O.
SECTION NO	12	SECTION MN		RHO	2.5000
CHORD		STAGGER		CAMB	
2.3154		.5 973		112.295	
ARFA	0.901998	SURFACE ARC LENGTH	6.36995		
SFCIIION C.G.		ALPIA	UPSILON		
SIRFAMSURFACE SECTION C.G.		0.10801	0.17811		
BLADF AXIS		0.09643	0.00804		
SLACKING AXIS (RADIAL)		0.09643	0.00804		
		-0.00220	0.		

PHASE IV ROTOR

•ZPC•

SFCI	NO	STAGE 4. ROTOR				NB	20
		RHO	CHORD	STAGGER	CAMBER		
AA	1	8.50000	4.0427	61.30	-2.96	0.02390	57.44
BB	2	8.00000	3.9874	56.44	1.96	0.02569	55.32
CC	3	7.50000	3.9732	52.14	6.51	0.03047	53.70
DD	4	7.00000	3.9560	48.25	11.50	0.03889	52.28
EE	5	6.50000	3.9030	44.23	18.18	0.05072	51.22
FF	6	6.00000	3.7722	38.88	29.01	0.06260	50.43
GG	7	5.50000	3.6707	33.24	44.70	0.07219	49.19
HH	8	5.00000	3.4580	27.11	65.17	0.08385	47.44
JJ	9	4.50000	3.1643	21.98	87.57	0.09510	45.68
KK	10	4.00000	2.8749	16.12	100.12	0.11188	43.95
LL	11	3.50000	2.6370	9.32	108.99	0.12893	41.79
MM	12	3.00000	2.4535	1.92	112.79	0.16212	38.38
NN	13	2.50000	2.3154	-5.97	112.29	0.19958	32.94

THE COORDINATES FOR THIS BLADE WERE PUT ON TAPE
IN THE SAME ORDER AS PRINTED ABOVE

SECTION XXI
CONCLUSIONS

The aerodynamic design of a series of five transonic compressor rotors was carried out under this contract. Each of the five designs is parametrically related to the baseline rotor documented in Technical Report AFAPL-TR-79-2078.

These rotors provide a matrix of aerodynamic designs that will help define the sensitivity of transonic blade rows to several design variables when tested in the future.

SECTION XXII

REFERENCES

1. A.J. Wennerstrom, and W.A. Buzzell, Redesign of a Rotor for a 1500 ft/sec Transonic, High-Through-Flow, Single-Stage Axial-Flow Compressor with Low Hub/Tip Ratio, Air Force Aero Propulsion Laboratory, Wright-Patterson AFB, Ohio 45433, AFAPL-TR-2078, September 1979.
2. George R. Frost, Richard M. Hearsey, Arthur J. Wennerstrom, A Computer Program for the Specification of Axial Compressor Airfoils, Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio 45433, ARL 72-0171,
3. Richard M. Hearsey, A Revised Computer Program for Axial Compressor Design Volume I, Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio 45433, ARL TF 75-0001, January 1975.
4. Arthur J. Wennerstrom, Personal Communication to L.H. Smith of General Electric Company, September 12, 1980.